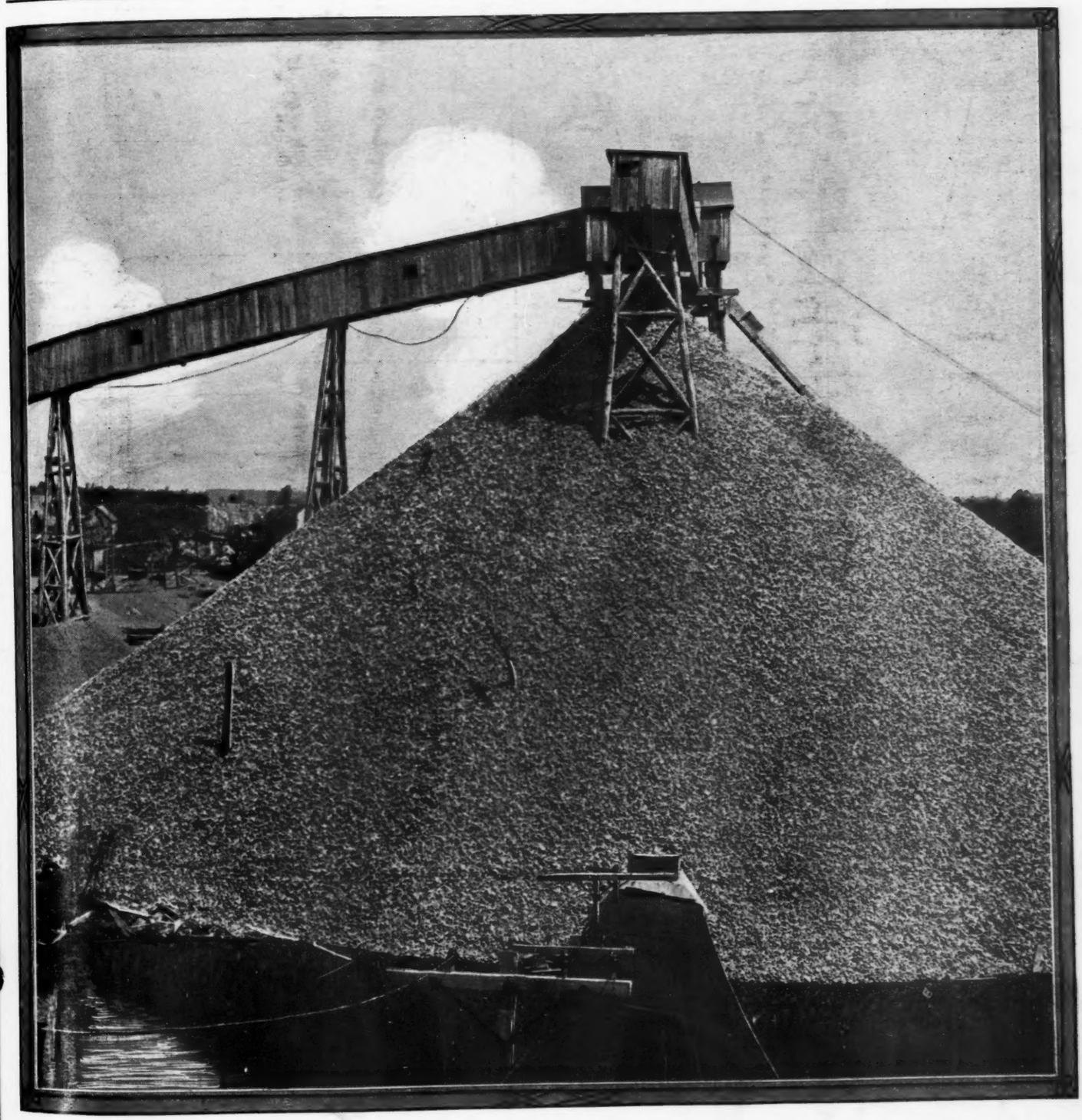
Rock Products

$2.00 A YEAR CHICAGO AUGUST 30, 1919



ROCK PRODUCTS is published every other week by Tradepress Publishing Corporation, 542 So. Dearborn St., Chicago. Subscription: $2.00 a year in the United States, $3.00 in Canada. Entered as second class matter July 2, 1907, at the postoffice in Chicago, under Act of March 3, 1879.

VOL. XXII—No. 18
Aug. 30, 1919

Rock Products seeks and reports everything of interest to producers of crushed stone, sand, gravel, lime, cement, gypsum products, agricultural limestone, phosphate, potash and glass sand. It spends many times more money than any other journal of the industry to compile its message every two weeks. Appreciate Rock Products.

Rock Products

26 Big Issues *for* $2

Stands without a peer in the industry. It serves the plant owners without stint or bias. Its reading pages are loaded with pictures and news.

Its advertisements are on advertising pages—where in fairness to all—they belong.

Read Rock Products—not because it serves you unselfishly but because it is the best paper. Subscribe!

Fill Out and Mail the Coupon—Now!

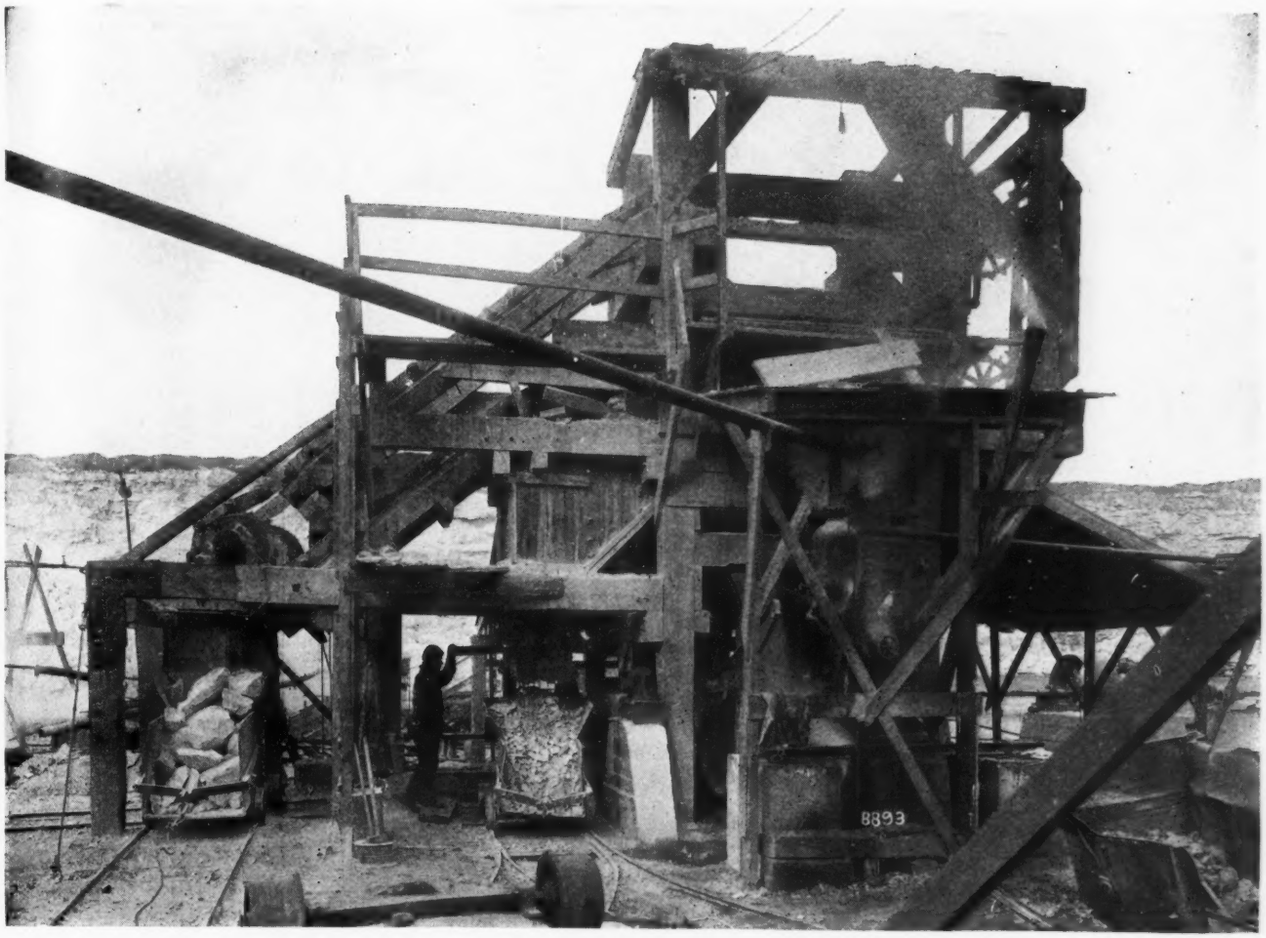
ROCK PRODUCTS, 542 So. Dearborn St., Chicago

Here is my $2.00 for a full year's subscription to ROCK PRODUCTS.

Name.....

Address.....

Saying, "I saw it in ROCK PRODUCTS," will bring quick action



Mr. Lime Man:—How about taking all the spalls out of your kiln-stone mechanically? The cut above shows a plant which has had three years' hard service and is turning out the two products shown, into skip cars. One is spall for the grinding plant. The other is kiln-stone, screened and cleaned. This means more lime, less fuel, larger lumps, and if you use a steam shovel and a jaw crusher set to 8 in., your core troubles practically disappear.

We have built several plants like this, and would like to prescribe for you.

LINK-BELT COMPANY

361

PHILADELPHIA		CHICAGO			INDIANAPOLIS
New York — 299 Broadway	Huntington, W. Va.	Robson-Prichard Bldg.	San Francisco	582 Market St.	
Boston — 49 Federal St.	Cleveland	429 Rockefeller Bldg.	Los Angeles	163 N. Los Angeles St.	
Pittsburgh — 1501 Park Bldg.	Detroit	932 Dime Bank Bldg.	Toronto, Can.	Canadian Link-Belt Co., Ltd.	
St. Louis — Central Nat'l Bank Bldg.	Kansas City, Mo.	306 Elmhurst Bldg.	Denver	Lindroth, Shubart & Co., Boston Bldg.	
Buffalo — 547 Ellicott Square	Seattle	576 First Ave., S.	Louisville, Ky.	Frederick Wehle, Starks Bldg.	
Wilkes-Barre — 2d Nat'l Bank Bldg.	Portland, Ore.	First and Stark Sts.	New Orleans	C. O. Hins, Hibernia Bank Bldg.	
Birmingham, Ala.		S. L. Morrow, 720 Brown-Marx Bldg.			

LINK-BELT

STONE HANDLING MACHINERY

We Also Make

- ☐ Elevators and Conveyors
- ☐ Link-Belt and Sprockets
- ☐ Silent Chain Drives
- ☐ Truck and Tractor Chains
- ☐ Electric Hoists
- ☐ Portable Loaders
- ☐ Coal and Ashes Systems
- ☐ Coal Pockets
- ☐ Complete Sand and Gravel Plants

Write for Catalogs
Place X in Square

For better service say, "I saw it in ROCK PRODUCTS"

World's Largest Condenser

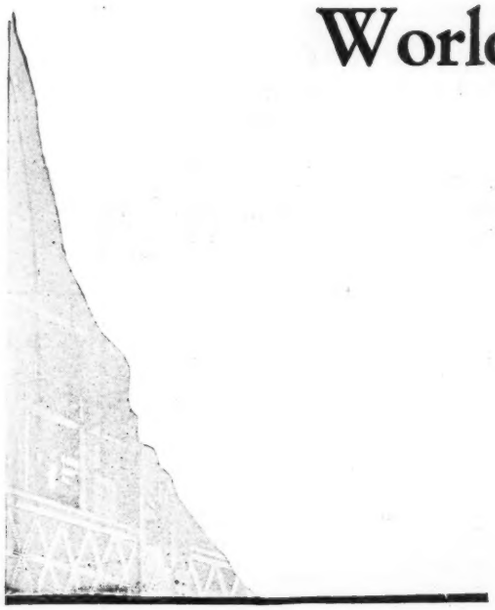
Weighs 700,000 pounds
Contains 50 miles tubing

THIS condenser will be used to condense the exhaust steam from a 35,000 kilowatt turbo-generator.

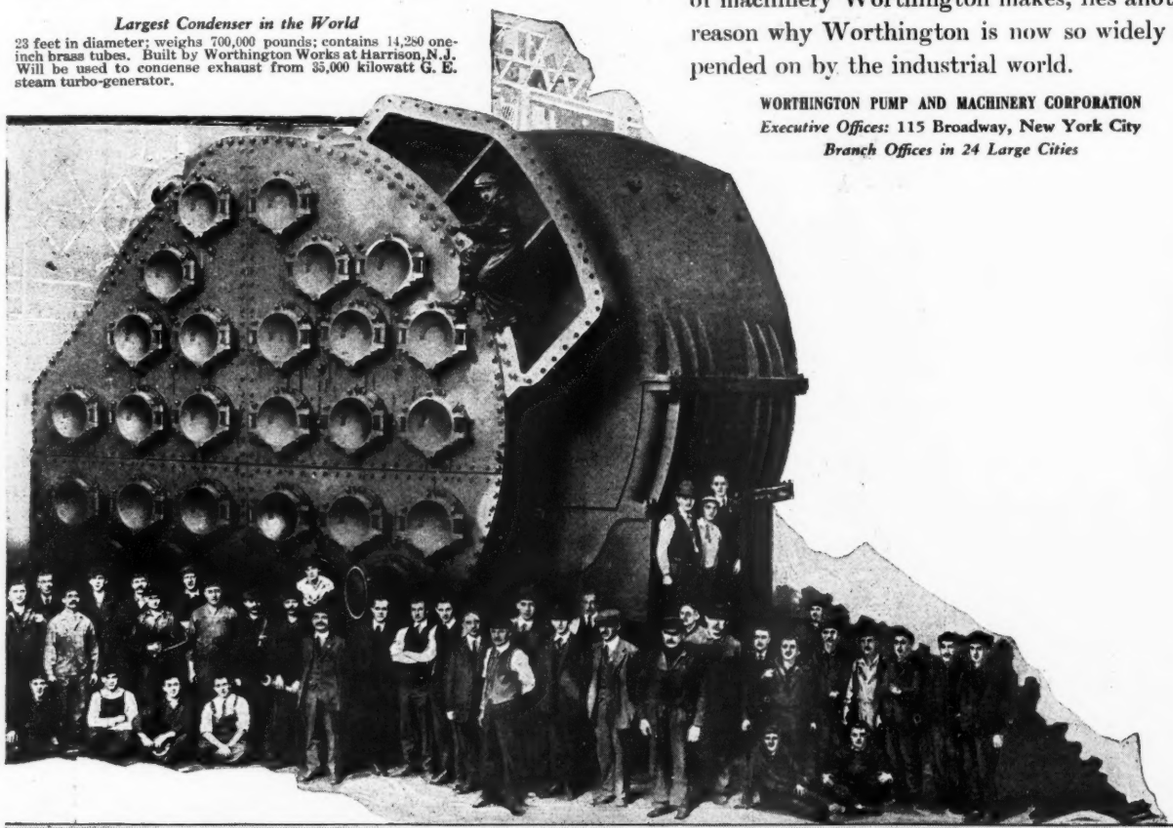
For seventy-nine years Worthington has been building condensing apparatus. And now, just as it would be difficult to find a type of pump Worthington does not build, so would it be hard to find a condensing problem Worthington could not solve.

In its completeness, which extends to every line of machinery Worthington makes, lies another reason why Worthington is now so widely depended on by the industrial world.

WORTHINGTON PUMP AND MACHINERY CORPORATION
Executive Offices: 115 Broadway, New York City
Branch Offices in 24 Large Cities



Largest Condenser in the World
23 feet in diameter; weighs 700,000 pounds; contains 14,280 one-inch brass tubes. Built by Worthington Works at Harrison, N.J. Will be used to condense exhaust from 35,000 kilowatt G. E. steam turbo-generator.



PUMPS–COMPRESSORS–CONDENSERS–OIL & GAS ENGINES–METERS–MINING–ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Deane Works, *Holyoke, Mass.* **Hazleton Works,** *Hazleton, Pa.* **Laidlaw Works,** *Cincinnati, Ohio* **Gas Engine Works,** *Cudahy, Wis.*
Blake & Knowles Works *East Cambridge, Mass.* **Worthington Works** *Harrison, N. J.* **Power & Mining Works** *Cudahy, Wis.* **Snow-Holly Works** *Buffalo, N. Y.*

Prompt attention will be given your inquiry if you mention ROCK PRODUCTS

Telsmith Bolt-Shaft Breaker

Ad Number Three

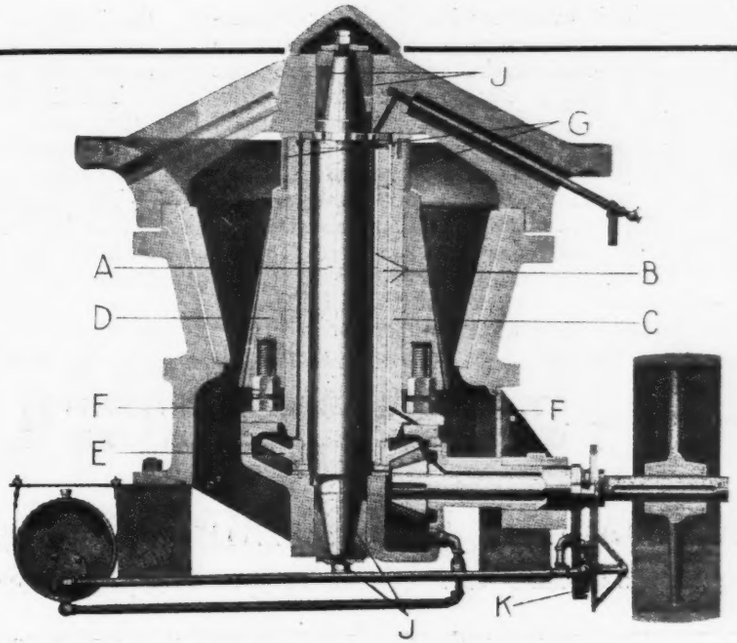
The one big fundamental advantage of the Telsmith Primary Breaker is the parallel crushing stroke. Telsmith exerts the **full stroke** on the big lumps just as they enter the bowl. The initial bite is a long, horizontal, bull-dog grip that doesn't let go. It just fairly eats into the rock, increasing the capacity, reducing the labor in the quarry and over the crusher. But there are other things which have assisted the Telsmith Breaker to its predominant standing in the coarse crusher field. For instance:

While the **width** of the opening is the same, as in other gyratory crushers, in every other dimension of the concave bowl, crushing cone and feed openings, Telsmith is 25-35 per cent bigger than other crushers. Don't take our word for it, but measure up the machines. When you have done that, you'll not be surprised to find Telsmith doing such splendid work at such plants as Charles Warner Co., Wilmington, Del.; Defrain Sand Co., Philadelphia, Pa.; Kentucky River Stone and Sand Co., Lawrenceburg, Ky.; St. Joseph Lead Co., Bonne Terre, Mo.; R. L. Hatfield, McAlister, Okla.; Phelps Dodge Corp., Tyrone, N. Mex.; Story Rock Co., Bozeman, Mont.; Kennecott Copper Corp., Latouche, Alaska; Braden Copper Co., Rancagua, Chile; Penn Iron Mining Co., Vulcan, Mich., and a host of others.

Glad to send you our breaker Catalogue No. 166 and our Bulletin No. 2F11 describing the Telsmith Reduction Crusher.

SMITH ENGINEERING WORKS

3188 Locust St., Milwaukee, Wis.

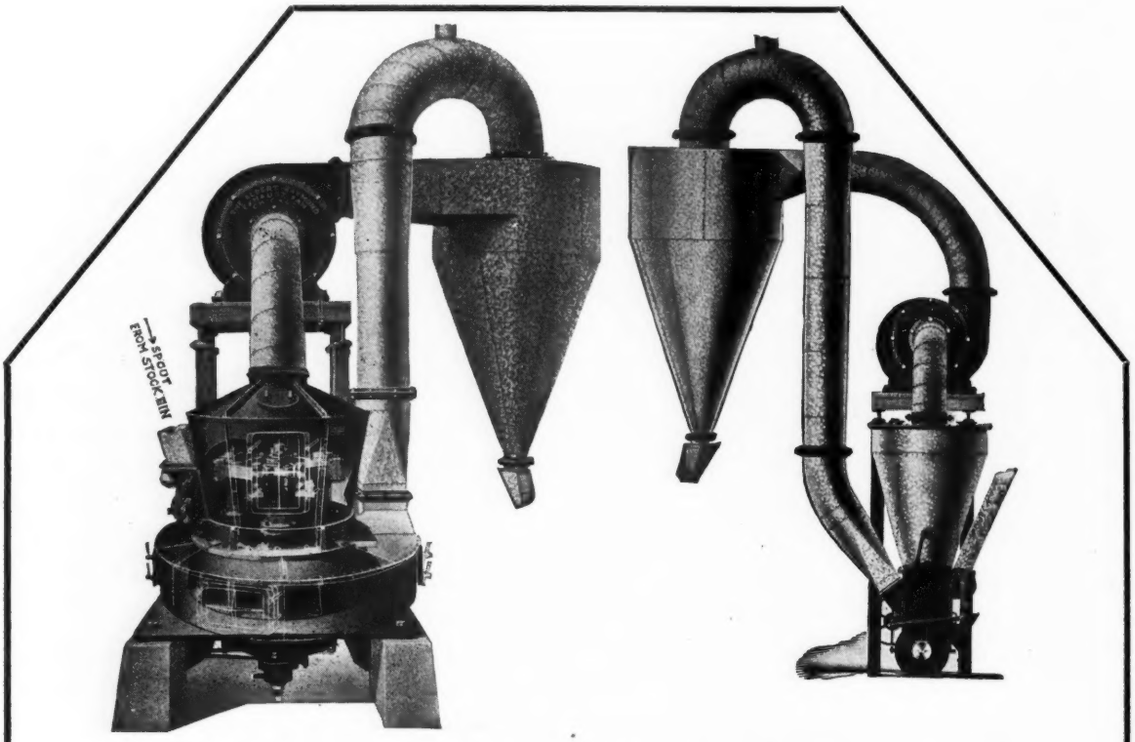


545 Old Colony Bldg., Chicago, Ill.; 30 Church St., New York City; 930 Oliver Bldg., Boston, Mass.; 325 W. Main St., Louisville, Ky.; Garfield Bldg., Cleveland, Ohio; Franklin and Channing Aves., St. Louis, Mo.; 523 Boston Bldg., Denver, Colo.; Salt Lake Hardware Co., Salt Lake City, Utah; Road Builders Eq. Co., Portland, Ore.

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry

RAYMOND
PULVERIZING
AIR-SEPARATING
SYSTEM
CHICAGO-U.S.A.

RAYMOND
PULVERIZING
AIR-SEPARATING
SYSTEM
CHICAGO-U.S.A.



Engineering Service That Spells Dollars to You

Here is what one of our customers writes us:

"We are now operating one of your No. 0 Pulverizers which we have recently fitted with improved separator, thereby increasing our output about **fifty barrels** per day."

This customer installed our Pulverizer seven years ago for the production of a pure hydrated lime. Since that time, due to our policy of always making every effort to improve our mills, we found that if we substituted a smaller size separator for the size we had been using we obtained a much larger capacity, besides producing a better grade of lime.

The above customer had the large separator and when they asked for prices on an additional mill to increase their capacity we furnished them with the improved separator, instead, which cost them a great deal less and produced the results indicated above.

This incident is in direct line with many other cases where we have improved methods of grinding and saved our customers thousands of dollars.

The latest improved Raymond Roller Mills and Pulverizers will do the same for you, as they can't be equalled when it comes to the economical grinding of all dry materials to powdered form.

Send for descriptive matter today.

EVERY RAYMOND MILL IS COVERED BY AN ABSOLUTE GUARANTEE BASED UPON PAST PERFORMANCES

RAYMOND BROS. IMPACT PULVERIZER CO.

Western Office:
202 Boston Bldg., Denver, Colo.

1301 North Branch St., Chicago, Ill.

Rock Products

TRADEPRESS PUBLISHING CORPORATION
542 SOUTH DEARBORN STREET
CHICAGO

NATHAN C. ROCKWOOD, Editor GEORGE P. MILLER, Manager C. F. TREFZ, Associate Editor

PUBLISHED EVERY OTHER SATURDAY by the Tradepress Publishing Corporation, 542 South Dearborn St., Chicago, Ill., U. S. A. W. D. Callender, president; T. J. Sullivan, vice-president; George P. Miller, Treas.; C. H. Fuller, Secy.

SUBSCRIPTION

$2 a year in United States; $3 a year, Canada and foreign. Single copies, 20 cents. Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

Entered as second class matter July 2, 1907, at the Postoffice at Chicago; under act of March 3, 1879.

Vol. XXII, No. 18 August 30, 1919

Printing of this issue, 4,000 copies

Second class entry at U. S. Post Office.

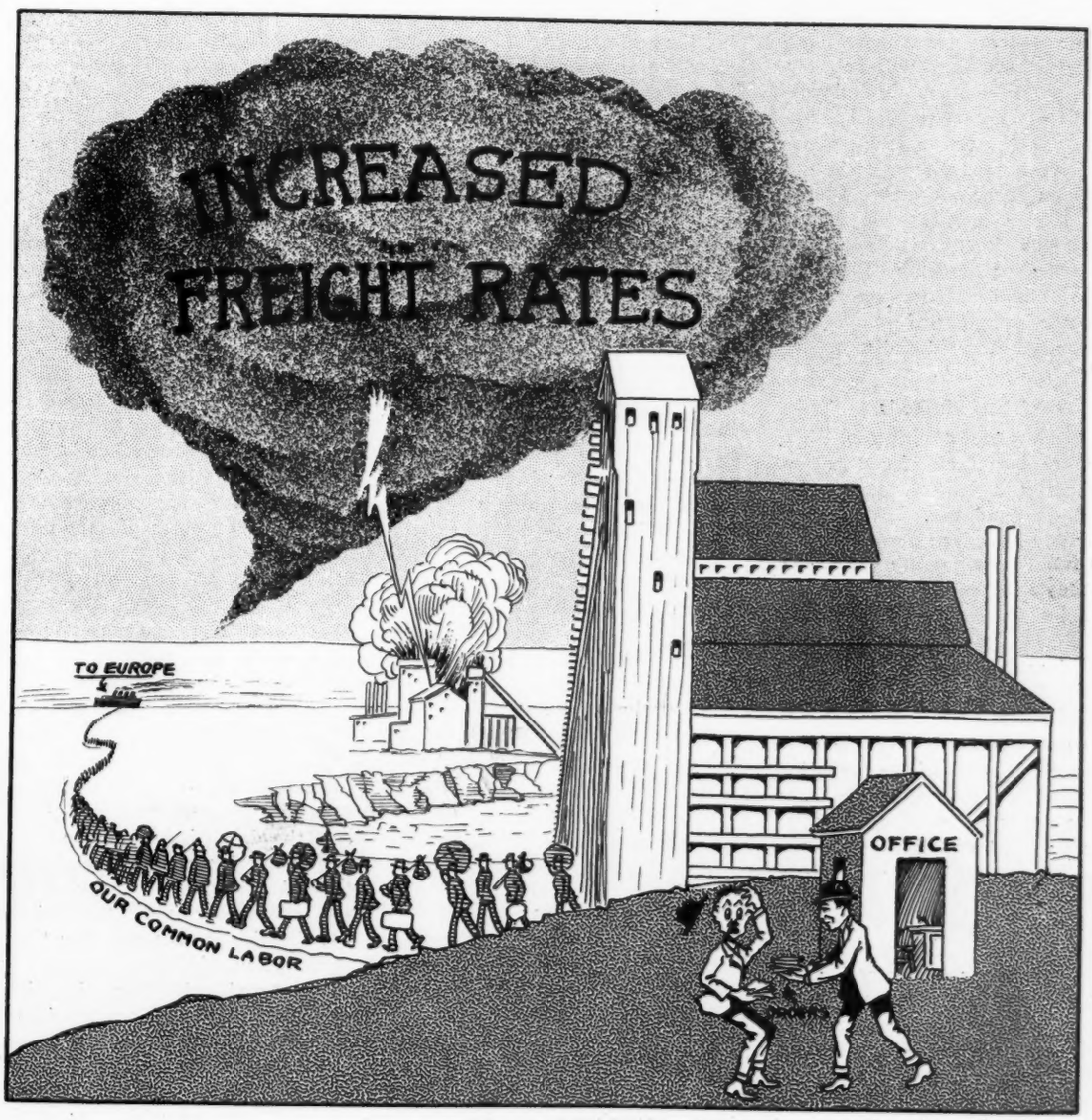
Table of Contents

ALPHABETICAL LIST OF ADVERTISERS

Rock Products

Vol. XXII | Chicago, August 30, 1919 | No. 18

How to Solve Your Operating Problems in 1919



Keep Smiling!

Handling Orders and Car Service

Keeping Track of Orders as They Come in and as They Are Filled—How Some Up-to-Date Plants Do It

IN ANSWER TO A QUERY from one of its subscribers, ROCK PRODUCTS conducted a little investigation as to what is the practice of sand and gravel and crushed stone producers in keeping track of orders and car shipments. Some of the results are given herewith. The editor, first of all, wishes to thank the kind friends of ROCK PRODUCTS for their generous response to his inquiries.

Great Variety of Practice

At the start, it should be stated that there evidently is a great variety of practice. Moreover, there is great interest in the subject, as several producers have written to state that they will be very glad to see an efficient method developed. From this interest shown it is believed that the subject would be an excellent one for a topical discussion at the annual meetings of the national and local associations. It is not possible within the scope of this short article to much more than introduce the subject.

The only method in common to all seems to be the assigning of numbers to orders as they are received and to subsequently refer to them by that number.

Coon River Sand Co. Methods

The most complete description of a method for keeping track of orders has been furnished by R. Snoddy, manager of the Coon River Sand Co., Des Moines, Ia. Mr. Snoddy has given permission to use this in full. Subsequently variations in Mr. Snoddy's methods by other producers will be discussed. Mr. Snoddy writes:

"By way of explanation I will say that our plants are located on a terminal system which connects with all the railroads (nine of them) leading out of the city. We order cars from each of the roads for the shipments to go out on its line. Cars loaded at the plants to be unloaded in the city on the terminal system must be ordered from the terminal company. Hence we have ten sources of ordering cars.

"When an order is received it is placed on the order book, where we show the date of the order, our customers' order number, his name, the place to where invoice must be sent if different from shipping directions, our order number, the size of the car requested, the character of material desired, the road over which it must be shipped and point of destination, and whom to notify when shipment is made.

"This order book is a wide book and there is a column for each of the foregoing mentioned items of information. We next have what we call a 'slate'—a page in the book with a space about three inches square for each different railroad and in each of these squares there are columns for each of the different kinds of materials which we load. (We are prepared to load ten different types of material.) Our order number is placed in the column under the heading of the kind of material called for in the order, in the square assigned to the railroad on which shipment must be made.

Order Number for Every Car

"If the order calls for more than one carload we assign to that order as many of our order numbers as there are to be carloads. If an order calls for two or three cars per week or any other specific instructions we will enter as many numbers on the slate as are to be shipped in one week and put a bracket around them with an explanation of the shipping instructions. Each night, after crossing off from the slate the order numbers for the orders shipped that day, we check up the number of cars required for each different road for the following day.

"The opposite page of this book is what we call our 'car order sheet.' It is ruled from top to bottom into ten spaces, one space for each of the railroads from which we must order cars. Each space is divided into three columns. One line running across the page for each day. The first column under each road will show the number of cars we will require from that road; the second column will show the number we have left on hand for shipment on that road. The last column will show the number of cars to be ordered from that road, which, together with the number on hand, will make the number we need. We then call each of the railroads by telephone and give them the order for the number of cars indicated which we require from that road for the next day, and when we check this to show the cars have been ordered, we give the initials of the railroad clerk with whom the order was placed. The next day, if the cars do not show up, or if there is any mistake made on our order to the railroads for cars, we have a direct check and know whom to kick.

"When the cars enter the plant the car clerk there takes a list of all the cars by number and initial and capacity and the road they are from and reports to the office by telephone, stating the number of cars from each road. He is then given loading instructions from our loading slate, showing the number of cars for each road for each different grade of material. He then marks in a column on his record, opposite the number of each of the cars which have reached the plant, the kind of material to be loaded in that car. At the end of the day the plant car clerk reads off the number and initials of the cars, the capacity, the kind of material loaded into them and the road to which they have been returned.

"This we write into what we call the 'car book,' and this information occupies about the center of the book. We then sort the cars by writing in front of each car number the customer to whom it is to go, showing our order number and our customer's order number. We then write the bill of lading for each car and the office boy delivers them around to the different railroads.

"The terminal company switches the cars in the early part of the night to the roads on which they go out, and by reason of the railroad company having the bill of lading before they receive the car, everything is in readiness for the car to move promptly on the first train the following morning.

"Twice each week we send to each road a list, giving the number, initial and date of loading of each car sent out on their road and they supply in the columns for that purpose the gross, tare and net weight of each of these cars as shown by their scale records and return this list to us. We copy this into our car book following the car number, and the price is then entered and the amount figured out and entered in the last column.

"Each car is then transferred to our customer's account in what we call the sales ledger, where we show his name, address, credit rating and other particulars at the top of the page. We enter the date of shipment, our order number, his order number, destination, character of material, the tons contained in the car, the price per ton and the total. An invoice is sent showing this same information. When remittance is made it is entered, showing the date and the amount, and it is entered as far down on his account as to where his remittance balances the account. We also show in connection with the remittance the journal page on which his remittance is entered.

"It will be observed that the order and shipment do not enter into the regular bookkeeping until the amount is paid. At the end of the year, on December 31,

all unpaid accounts are entered into the books as accounts receivable, and in the future all remittances on these old accounts is credited to accounts receivable.

"Once each month our numbers are checked to see that no order has been lost. Also, our car book at the office is checked with the carloading records at the plant to see that no car has been loaded and got away from the plant without being charged to the customer. Also the record of cars received at the plant is checked against the cars going out from the plant to see that none have been lost. If a car is received in bad order and returned to the railroad company empty a record is made to show this.

"Since we have had this system in operation, some five years, we have never had an order become lost on our books and have never had a dispute with a customer about shipping him more than he ordered, and have never permitted the railroad company to beat us out of one nickel of switching fees or demurrage, and in all disputes have been able to win out for the reason that we have written records of everything.

"We have several plants, all located on the terminal, and are sometimes loading at three places at one time. These plants go by number and we always show at what plant a car is requested when ordering from the railroad company, and when the car is loaded our records show which plant did the loading.

Inspection of Material Loaded

"One man rides all the cars past the chutes and sees all the material which goes into the car. He is given instructions at the time any orders are given to the plant as to the character of material required on each order, and if the material as loaded is not up to standard it is up to him to kick, and the superintendent of the plant must unload the car and reload it with the kind of material called for in the order.

"This one man works under the directions of the office and not under the directions of the superintendent, and the superintendent has no authority over the loading instructions which this fellow directs. This sometimes causes friction between the men. Like all plants, we sometimes get material which is not up to standard and should not go out. When this inspector condemns the car it must not go out and no one at the plant has authority over him in this matter. If a dispute arises the car is held up until inspected and passed by the manager. Only once in three years has the manager ruled against the inspector."

Connecticut Quarries Co.

Irving S. Tinker, secretary of the Connecticut Quarries Co., New Haven, Conn., describes his company's method as follows:

"Our quarries are located some distance from our office and therefore practically all the orders are telephoned from our home office. As soon as an order is received we acknowledge receipt of the same and copy it on a form showing first to whom it is to be shipped, the siding, if any, and destination, the route, for whose account, and to whom the shipping notice is to be sent, the quantity and size of material and shipping instructions (see Fig. 1). This copy is mailed to the quarry for comparison with their telephone copy which they make out on a similar form when the order is telephoned.

"The original order is then placed in a folder which contains only the orders which that particular quarry is shipping. Each morning when the report for the previous day's shipments is received, these are checked off with the original orders, and in this manner we are able to keep track of the shipments and see that the quarry does not skip the daily shipments or ones that are to be shipped periodically. As soon as an order is completed it is taken out of the quarry folder and filed in the regular way.

Form 18

THE CONNECTICUT QUARRIES COMPANY

..... **Quarry** .....

Ship to .....

Siding .....

At .....

Via .....

Send Shipping Notice to .....

.....

Quantity and Size

Special Instructions

Freight:— **Collect** ☐ **Prepaid** ☐

Type of Car:—

Order from .....

Taken by .....

Fig. 1. Order blank used by Connecticut Quarries Co.

"The forms used are printed on yellow and white paper. The white sheet is the one that is made in this office and sent to the quarry for confirmation, and the yellow sheet is the one that is used at the quarry and is the form on which they take down the order when received by telephone. On the reverse side of this yellow sheet they keep track of the shipments (Fig. 2)."

Loose-Leaf Scheme General

This is in general the scheme most generally used. It does not involve the use of a record book, all the records, except the final bookkeeping, being kept on loose sheets. The forms used vary somewhat. That of the Greenville Gravel Co., Greenville, Ohio (H. B. Hoel, sales manager), is shown in Fig. 3. Mr. Hoel states:

"We have tried several different schemes for the recording of orders and now have in use at all of our plants a loose-leaf arrangement which we find very satisfactory. We have printed a special blank form 5½ by 8½ in. in size. These forms come from the printer in pads of 100 sheets and are numbered consecutively, each sheet representing a separate order with the number printed at the bottom of the sheet. On this blank, space is provided for recording all data in connection with the customer's order, such as date, terms, amounts and shipping instructions. This requires about the first half of the sheet, then the lower half is ruled in columnar form to take care of notes as to car number, initial weight, contents and invoices check.

"There are several advantages we have found in handling our orders according to the foregoing outline; about the most important one, in our opinion, being that filled orders may be readily separated and filed and the unfilled orders arranged according to different classifications, as to the time of shipment or grades of materials."

RECORD OF SHIPMENT

NOTE: Keep each size separate show total of each size on first line.

Date	AMOUNT SHIPPED In Pounds	Balance Due Tons	Date	AMOUNT SHIPPED In Pounds	Balance Due Tons

Fig. 2. Reverse of Connecticut Quarries Co. order blank

Cards in Place of Blank Forms

The Menantico Sand & Gravel Co., Millville, N. J., Hugh Haddow, Jr., manager, has a system of keeping track of orders and shipments by means of card files, which he explains as follows:

"We keep track of unfilled orders on which periodical shipments are made by the use of two files, one called an 'original order' file and the other a 'shipping file.'

"When an order is received it is placed in the original order file and marked with the shipper's order number. A card is then made out, having thereon the customer's name, consignee's name, customer's order number, consignee's order number, railroad delivery and routing, freight rate, quantity and price of material, shipping instructions, and any other necessary information. All of this information will take but very little space on the card.

"Then this card is placed in the shipping file, which may be a box file or arch file or any other kind of file, arranging the cards by days according to schedule. Have as many divisions in the file as there are shipping days in the month or week as desired. If a shipment is to be made every other day, or whatever is desired, place the new card in under the date of the first shipment, then when that day comes around all the shipments that are scheduled for that day can be seen at a glance. When the shipment is made place the card under the next shipping date desired, and so on until the order is completed."

Loose-Leaf and Order Book Both

A few producers evidently retain the regulation order book in addition to the loose-leaf system, and this, too, has its advantages, as noted by H. L. McGurk, of the Interstate Sand & Gravel Co., the Macksville Gravel Co. and the Montezuma Gravel Co., Terre Haute, Ind. Mr. McGurk writes:

"All orders received in this office by mail or wire are numbered consecutively and entered in the record book. Ac-

THE WESTERN INDIANA GRAVEL CO.

TERRE HAUTE, IND.

ORDER

№ 1367

'Phone
Letter....., *19*

Sold to .....

Ship to .....

Confirmed .....

Price.....*per ton.* *Rate*..... *Prepaid.* *Collect*

DATE	INITIAL	NO.	CONTENTS	B. W	C. W.	INV. NO.

135-19

Fig. 3. Order blank of the Greenville Gravel Co.

knowledgment of orders is mailed and it contains the customer's number, if any, and our number. The order is written up on a blank sheet in duplicate. This sheet contains also the customer's number and ours, the number of cars and the grades of material ordered, and any special directions as to mailing shipping notices.

"The original is mailed to the plant superintendent and the duplicate is retained in this office. The plant superintendent enters orders in regular order in a book similar to that kept in this office and places the unfilled orders on a clip in front of his desk. On these orders, until filled, notation is made of each car shipped until the order is completed, when it is filed and the book record is closed.

"The same method is used in the general office. Orders received at the plant by mail or wire, or orders picked up by the traveling representatives and sent direct to the plant, are placed on file and the general office asked to confirm all such orders. They are not entered in the record book until numbers have been assigned to them by the office.

"By numbering and recording our orders in this manner, we have found that an order lost in the mails is discovered when the superintendent notes the absence of the number when recording his orders."

The Keystone Sand & Supply Co., Pittsburgh, Pa., also uses an order book, which A. W. Dann, vice-president and treasurer, describes as follows:

"A large, specially ruled order book in which orders are entered on horizontal lines and then the different information about them, such as number of cars on total order, number of cars to be shipped each day, shipping point, delivery point, type of car, date and number of customer's order and all the rest of the usual information is kept on the same horizontal line. At the right hand of each page is a large blank space on the same line under the heading 'shipment,' and here we record, each day, how many cars go out on the order and how many cars are left to fill the order. In this line also we write various memoranda which may come in from the customer relative to his order and changes in the number of cars are put down, and when finished it is red penciled; and when a page of orders is completed, a red line is drawn across the face of it.

"This is quite a compact record, and so far as our business is concerned, it has been quite satisfactory, but it can doubtless be improved upon in several ways."

Cards and Record Book

The Ideal Sand & Gravel Co., Mason City, Ia., has a method of using a card index and a book record which seems to be quite unique and very simple. It is described by W. P. Brahny, of the traffic department, as follows:

"When an order is received in this office, it is written in an order book which is similar to a day journal, and transferred from there to an order card. These cards are filed in an index alphabetically, according to the railroads to be shipped over, and each day a loading sheet is made up from this card file for the superintendent to line up his orders with.

"Should there be contracts among these cards calling for several cars, for instance, an order for 50 cars to be shipped, one car today, the 21st, two the 22d and one the 23d, it is marked on the bottom of each order card to that effect, so when lining up these orders for loading, the order clerk will notice the notations on the bottom of each card and line up the business for that day accordingly. Should, through some mishap, one day pass without taking care of an order, it is bunched with the next day's loading or else omitted entirely — however the order clerk may feel that the customer will be best satisfied.

"Should contracts be entered with no

FORM 81

UNITED STATES CRUSHED STONE CO. Our Order No. 22807

Customer's Order No._____ Req. No._____

Chicago,_____ 19____

Charge to_____ Ship to_____

Address_____ Destination_____

Send Notice to_____ Routing_____

Address_____ O. K._____ Discount_____ Ton Yard

Rate_____ O. K. Price_____ Ton Yard F. O. B.

REMARKS							DETAIL OF ORDER						
DATE	REP'T NO.	INITIAL	CAR NO.	SIZE	QUANTITY		DATE	REP'T NO.	INITIAL	CAR NO.	SIZE	QUANTITY	

Fig. 4. Order blank used by United States Crushed Stone Co.

U. S. Crushed Stone Co.

		July	1	2	3	5	7	8	9	10	11	12	14	15
22807 7/1 Brect	Jas Todd 7924 Rockwell Sts Chic 5 Cars Concrete		3											
22808 7/1	Sud Stone Co. 19 Medizin Av Chicago		5	5	5	5								

Fig. 6. Long sheet record of orders filled

C. & E. I.

DATE	Order No.	CONSIGNEE	DESTINATION	NO. CARS ORDERED Sand	Gravel	Percentage Gravel	Balance Due On Order Sand	Gravel	When to Ship	REMARS
July 16	5	John Smith	Chicago	5			4-3 2-1		1 Car Per Week	July 16 23 30 Aug 6-13
"	6	—	—			P M 65			2 Cars Per Week	July X

Fig. 7. Record sheet used by the Summit Sand & Gravel Co.

shipping instructions for immediate loading, these cards are placed in the back of the file until such time as instructions are received."

Loose-Leaf Record Book

In addition to loose-leaf order blanks, such as those described, some producers keep a summary of the data they contain on appropriate sheets. A good example of this practice is that of the United States Crushed Stone Co., Chicago, whose method is described by A. J. Sullivan, vice-president, as follows:

"Order blanks are filled out in triplicate (Fig. 4). These blanks are in different colors—the original white blank is for the accounting department, while the yellow sheet is retained in this office for the sales department, and the pink sheet (without price shown) is sent to the shipping department.

"We also use a sales department memorandum covering matters pertaining to various orders, shut-offs, increases in shipments, etc., one copy being retained for the sales department and the other going to the shipping department. (Fig. 5).

"We have been using these for several years and have found them to be quite satisfactory.

U. S. Crushed Stone Co. _____ 191

SALES DEPT. CHICAGO

SHIPPING DEPT., McCOOK QUARRY No. 1400

Confirming Telephone Conversation of_____

Discontinue Shipments / Resume Shipments To (_____ Via_____

THIS REFERS TO ORDER No._____

Cars Crushed Stone_____

Cars Screenings_____

Signed_____

Fig. 5. Supplemental memorandum.

"In addition to the order forms, for the purpose of keeping track of all the orders, we make up every two weeks a long sheet (Fig. 6), with eleven spacings for orders, with details of shipments shown thereon. In the margin we show our order number, date received and routing. You will note by spacings on the right of the sheet for dates that it is sufficient to carry us for two weeks.

"Each morning upon receipt of our car shipments for the preceding day, we enter the number of cars shipped the previous day. In this way we are enabled to immediately correct any errors in shipping and also to take good care of our orders."

The Summit Sand & Gravel Co., Terre Haute, Ind., uses a very similar sheet (Fig. 7), which George J. Nattkemper explains as follows:

"As an illustration I have given you two examples on this sheet. Order No. 5 is an unfilled order and order No. 6 has been filled.

"When we receive an order from one of our customers, no matter whether it is for one or more cars, we make the order out on a regular blank, giving consignee, destination, routing, when shipments are to be made, etc. This information is then transferred to the order sheet and the sheets filed in alphabetical order in the filing case which we have for that purpose. As the order is filled, the car numbers are entered on this order sheet until the order is completed.

"The object of this sheet is to be able to determine at a glance how many orders we have on hand and when shipments are to be made without running through each individual order. After we get the billing for all cars loaded out of our plant each evening, we know exactly.

how many cars we want to order for the next day's loading. We find this sheet very convenient; however, there may be room for improvement."

These specific examples cover in general all the modes of handling this office detail which have come to hand. ROCK PRODUCTS will gladly extend the use of its columns for a further discussion.

No Railway Rate Increases in Immediate Future

THE ANNOUNCEMENTS of the President and Director General of Railroads in regard to the wage demands of the railroad shopmen lead to the conclusion that no increases in present railway freight rates will be made until conditions become more normal. The President has said that any wage increases made to any class of railroad employees until conditions become normal must come from the public treasury.

The same information in another form has been given various local sand and gravel associations which have protested against any further increase in rates on these commodities. The Railroad Administration has replied that there is no immediate danger of an increase in freight rates on sand and gravel. The railroad director has said that gravel rates will be increased if a general rate increase is decided on, but that there are so many contingencies that a definite answer is impossible.

Ohio to Be Marble Producer

A CARLOAD of Ohio marble has been received in Cleveland from the newly-opened quarries of the Norcross Marble Co. at Centerville. It is claimed that the recently discovered deposit will produce marble equal to the famous Tennessee product. If so Ohio will certainly be the *premier limestone state*.

Annual Convention of the National Crushed Stone Association

DON'T FORGET the biggest convention of the crushed stone industry will take place in Louisville, Ky., the second week in February, 1920. The American Road Builders Association will hold its annual convention and Good Roads Show in Louisville at the same time. R. B. Tyler, of the R. B. Tyler Co., Louisville, a director of the National Crushed Stone Association, is chairman of the committee on arrangements and will make ample reservations for the Stone Men. A. P. Sandles, 405 Hartman Bldg., Columbus, Ohio, is secretary. Now is the time to offer him suggestions for the program.

Illinois Road Funds Available

FUNDS at present available for road work in Illinois amount to about $30,500,000, exclusive of the funds to come from the $60,000,000 bond issue, according to recent advices from Good Roads.

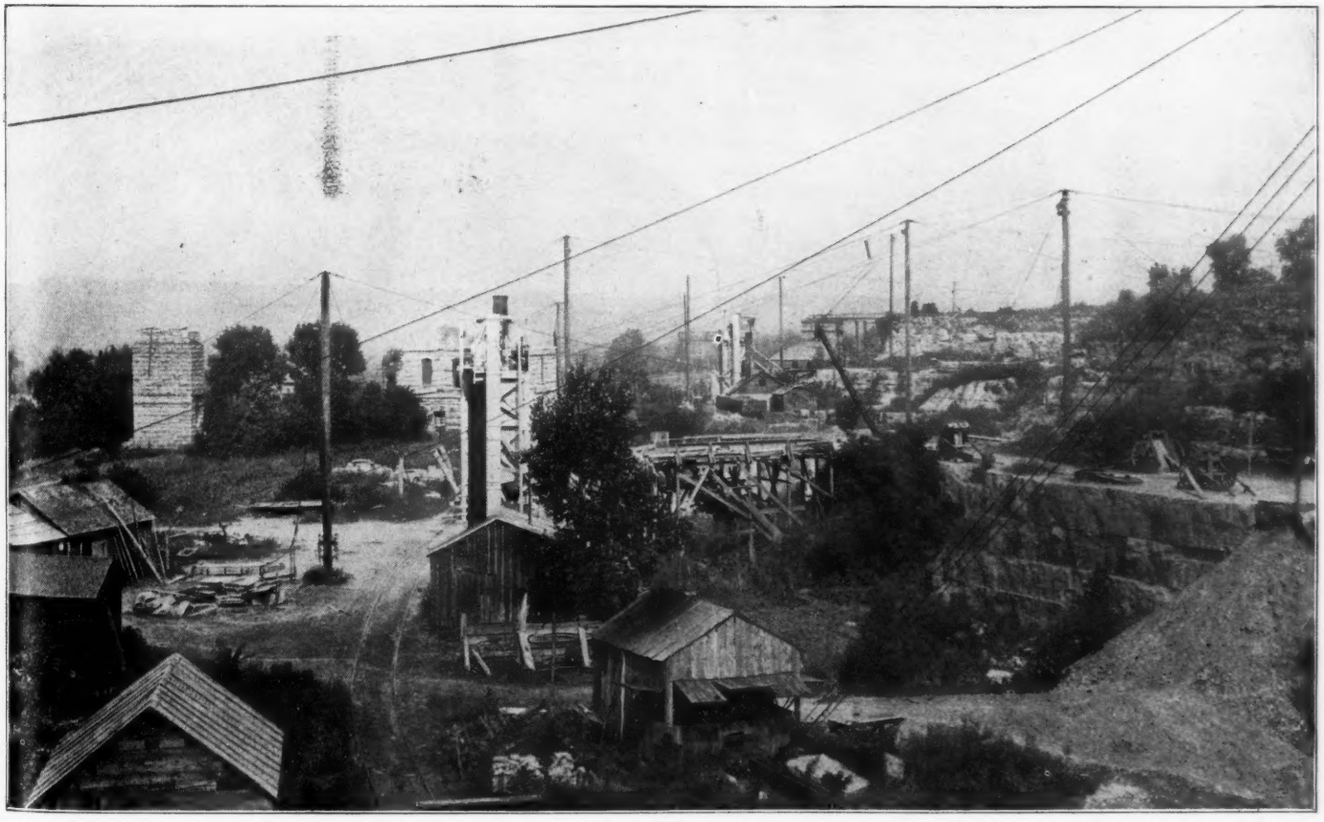
This sum comprises about $15,500,000 from automobile license receipts, federal aid amounting to about $12,000,000 and about $3,000,000 of bond issues voted by various counties. It is said that it will be unnecessary to use any of the funds from the state bond issue for the next two years, even if the maximum program is adopted.

Contracts for 400 mi. of federal aid work and for 100 mi. of state aid work have already been awarded, and it is expected that contracts for at least 200 mi. more of federal aid road will be let within the next 30 days.

Stone Industry of Mankato

BELOW is an interesting view of a part of the limestone industry of Mankato, Minn. In this view are several lime kilns, two crushing plants and numerous derricks and sheds for cut stone. Probably one would seldom find within such a short radius so much variety in limestone working.

The crushing plant and kilns in the foreground are part of the T. R. Coughlan Co. property, and those in the background belong to Fowler & Pay.



Limestone quarries, crushing plants and lime kilns, Mankato, Minn.

Special Features in Some Eastern Sand and Gravel Plants

Bin Elevators Avoid Use of Elevated Bins—Pan Conveyor Takes Place of Standard Belt—Skip Hoists

NOT ALL sand and gravel plants follow regulation practice; and all departures from regulation practice are not confined to the Middle West, as is sometimes believed. The accompanying views show some interesting features in sand and gravel plants recently constructed in the East.

Elevators vs. Elevated Bins

The first view shows a method of avoiding the use of elevated car-loading bins by the use of bucket elevators. This particular installation was for a blast-sand plant which was recently destroyed by fire. However, the same type of loading apparatus is being installed for the Raritan River Sand Co., New Brunswick, N. J.

The bin is designed to hold dry sand. It has a flat bottom with a light wooden floor laid directly on the ground on top of wooden stringers. The plan was for the bins to empty themselves as much as possible into the elevator hoppers, and beyond this the material forms a dead storage or natural hopper bottom, which it was not intended to ever clean out.

Each elevator receives material from either of two bins, of which there are six in all. The elevators are operated as shown through chain-driven gears by jaw clutches from the line shaft. This material was designed to be loaded in box cars, but the same principle could be applied to loading in gondolas.

This construction is said to be used at several silica sand plants. It saves foundations, flooring, columns, etc., for an elevated bin, and lowers the screens and the rest of the plant considerably. Of course, it is much slower than a gravity-chute loading device and could not be used where rapid loading or large capacities were essential.

Pan Conveyor

The second and third views show the use of a pan conveyor in place of the usual belt. These views are of the new Curtis & Hill Sand and Gravel Co., Morrisville, Pa.

This conveyor has a capacity of about 1,500 tons per 10-hr. day. It is about 116 ft. centers, and is built on a 30 degree incline. It is 42 in. wide and is built of pairs of steel strap chains of 24-in. pitch with heavy flanged rollers on the joints. The joints are brushed with case-hardened pins and bushings. It is a type of conveyor much used in the coal-mining industry but generally considered too high in first cost for a sand and gravel plant installation.

It is claimed that a 10-year operating record will prove economy in a conveyor installation of this type, while the horsepower required for operation of the two are about the same. The pan conveyor operates at slow speed and has a very high capacity as compared with a belt of the same width. A duplicate of the installation shown in these views at the ballast plant of the Delaware, Lackawanna & Western R. R., at Nichols, N. Y., is claimed by the manufacturer to have been in operation for over eight years with most of the original parts still intact.

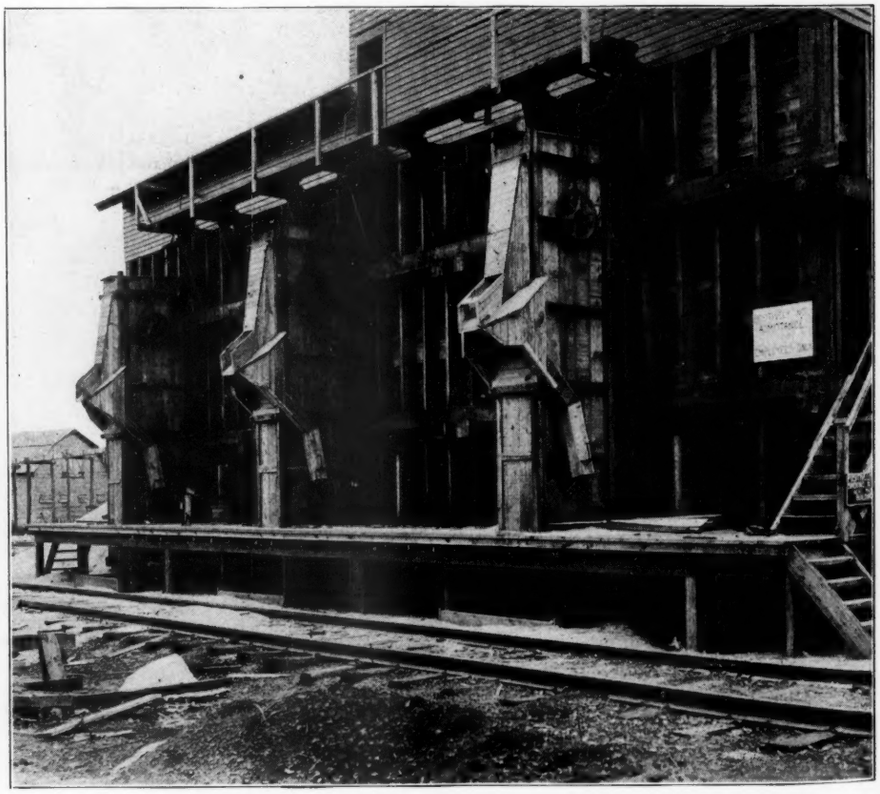
The pan conveyor of the Curtis & Hill plant takes the raw material as it comes from the pit. The pit is excavated by steam shovel and transportation to the plant is by means of a narrow-gauge railway and 4-yd. side dump cars and steam locomotives.

The crushing of the larger gravel is done after it has been elevated to the top of the plant and passed through a pair of rejection or scalping screens. The gyratory crusher is under the high end of the pan conveyor as shown in the side view of the plant. The output of the crusher goes to a wooden hopper below the crusher and is re-elevated to the top of the plant by a bucket elevator.

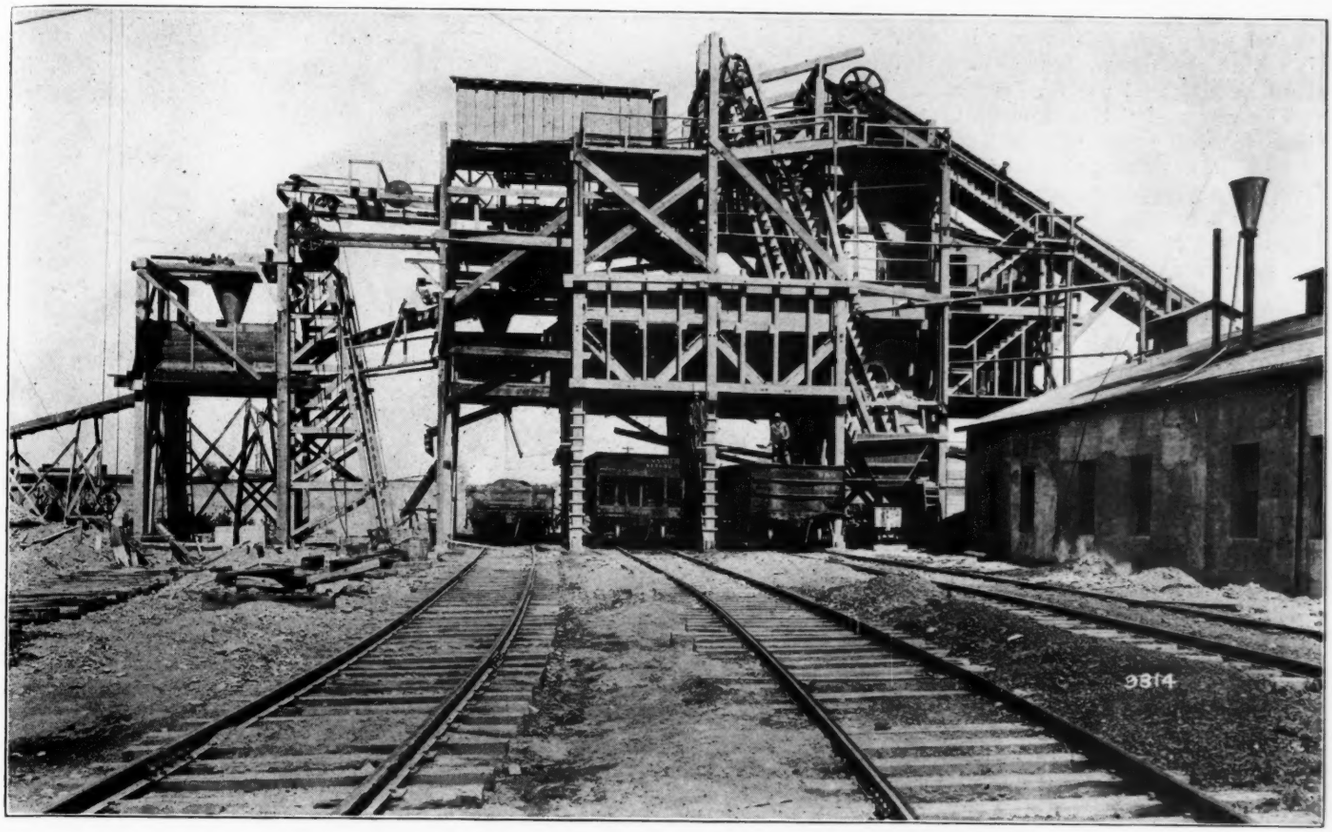
The rest of the plant consists of two batteries of sizing screens and two automatic sand separators, which deliver to two separated bins as shown in the upper view. The entire plant is electrically operated. The power house and the pump house are of reinforced concrete.

Skips vs. Conveyors

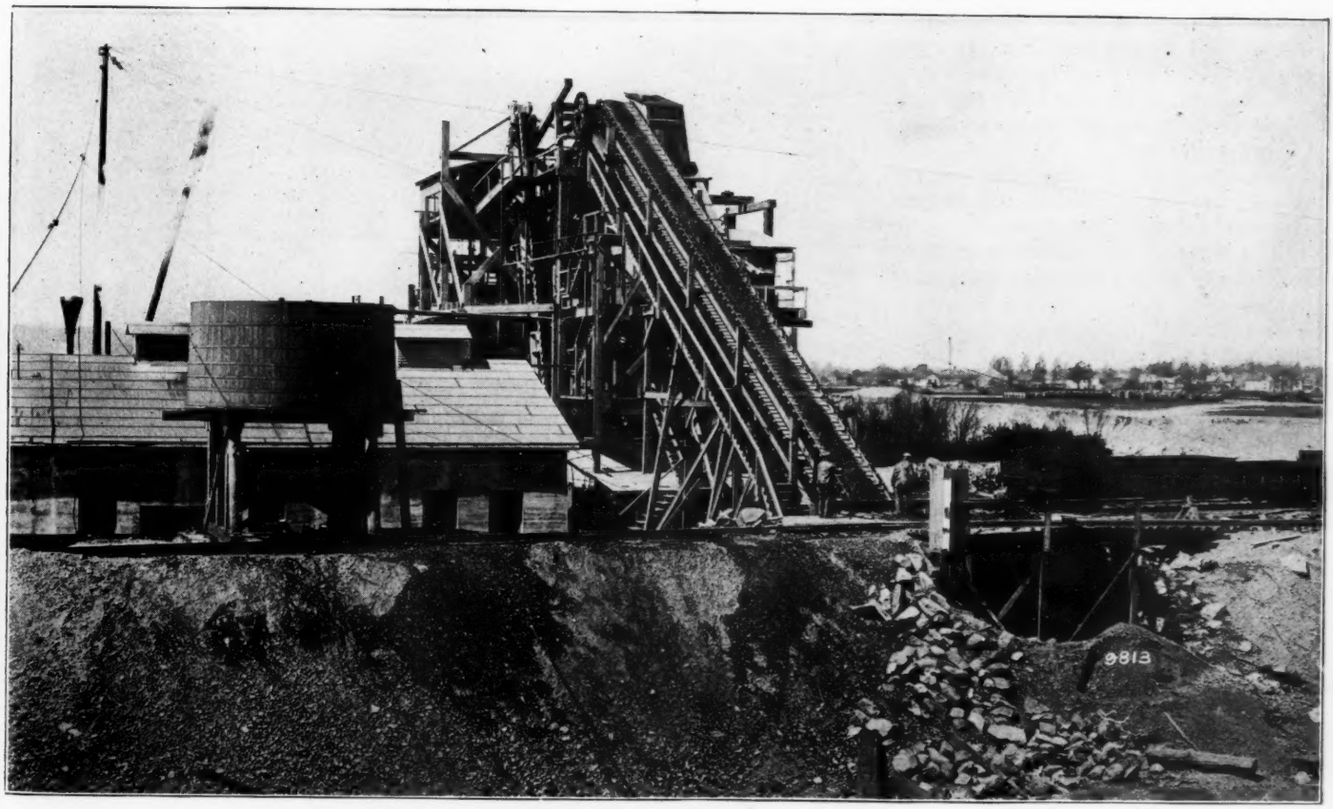
The use of balanced skip hoists and skipways in place of conveyors has been more or less general in crushing plants for several years, but it is unusual to find skips used in the sand and gravel industry. The last two views show such an installation at the Penn Sand &



Loading out of low bins by means of elevators



New plant of the Curtis & Hill Sand and Gravel Co., Morrisville, Penn.



Pan conveyor instead of usual belt; Curtis & Hill plant

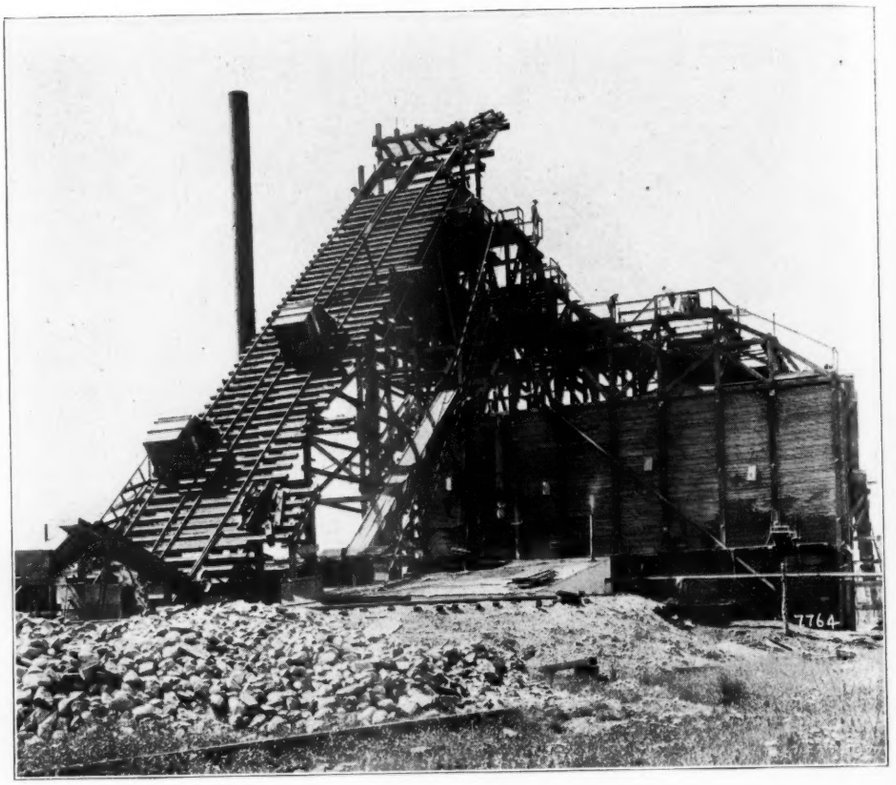
Gravel Co. plant, Tullytown, Pa. This is not an experiment, as the device has been in successful use for five years.

The raw material is brought to the plant in 2-yd. cars which are loaded by a drag-line excavator. These cars dump into a large track hopper, which delivers through a gate to either of two 4½-cu. yd. skips. The use of skips of course necessitates another hopper bin at the top of the plant.

From the hopper at the top the material is flumed by the addition of water to three Gilbert screens. A bar screen is provided in the screen-feeding hopper and rejections are chuted to two disc crushers. The crusher output is returned to the skip loading hopper by means of a belt conveyor.

This plant is designed to handle 1,500 cu. yd. per day, but the skip hoists are said to be capable of handling twice this amount.

All of the installations described were designed and constructed by the Link-Belt Co., Philadelphia. H. D. Pratt is the engineer of the company, to whom ROCK PRODUCTS is indebted for the photographs and data given.



Inclined skip hoists in place of conveyor

City of Indianapolis Engages in Gravel Business

THE CITY OF INDIANAPOLIS has embarked in the sand and gravel production business in competition with legitimate producers who have hitherto supplied material for city construction work. The new plant is a scraper-bucket inclined, fixed-screen proposition. The material is not washed. The estimated capacity of the plant is 180 cu. yd. per 8-hr. day.

The plant (and its cost of operation) is described as follows, in the Indianapolis News:

"The gravel plant cost the city about $5,000. The cost of operating the bucket hoist is $30 a week for the operator; $2.80 a day for one laborer and approximately $30 a month for oil and electric power.

"This year $17,814 was appropriated to buy gravel at the rate of 40 cents a yard, or 44,536 yards. This is the quantity of gravel necessary to cover one-third of the gravel and unimproved streets. The establishment of the city gravel plant will cut down the amount of such appropriation and an ultimate saving will be affected in this year's appropriation by applying money that would have been spent in buying this gravel to the establishment of the gravel plant.

"It is estimated that there is enough gravel in the river where the plant is situated to supply the city with gravel for the next fifteen years. Sand will also be provided for the city asphalt plant."

Penn Sand and Gravel Co. plant, Tullytown, Penn.

Nature, Origin and Properties of Sand

Third Article—Effective Size—Form of Grain—Specific Gravity

TWO PREVIOUS ARTICLES have discussed the origin of sand, its classification and its properties. This article is a continuation of the discussion on the properties of sand. These articles are based on "The Sand and Gravel Resources of Missouri," by C. L. Dake, of the Missouri Bureau of Geology and Mines.

Effective Size

The term effective size is defined as a size "such that 10 per cent of the material is of smaller grains, and 90 per cent is of larger grains than the size given." That is, if 10 per cent of a sand passed a 1 mm. screen and 90 per cent were retained on the screen, 1 mm. would be the effective size. As effective size is one of the factors used in determining the uniformity coefficient, this, together with the uniformity coefficient, defines rather closely the size and uniformity of a sand, and where effective size is also shown, the coefficient of uniformity means much more than it otherwise would.

Coarse sands are more satisfactory in concrete work, because each grain has a larger surface to which the cement coating may adhere, and actual tests show that mortars made of coarse sands have greater strength than those made with fine. Since in natural aggregate coarse sands are usually less uniform than fine ones, it follows that aggregates with a high uniformity coefficient are more desirable, both because they are coarser and because they have a lower percentage of voids.

FORM OF GRAIN—Sand is usually spoken of as sharp or round, depending upon the degree of its angularity. Angularity may be due to crystal form, cleavage, or to crushing of grains. In natural sands, crushing usually plays but a small part in producing sharpness of grain. Quartz, which is the chief mineral of most sands, has practically no cleavage, and is rarely found crushed in nature. In general, its angularity, therefore, depends on its crystal form. On the other hand, feldspars have very perfect cleavage, a factor responsible in part for angularity in feldspathic sands.

Crystal form, which is responsible for the angularity of most sands, may be the crystal outline still retained by the quartz grains from their first crystallization from a cooling magma into an igneous rock. Constant attrition during the processes of weathering and erosion rounds these crystal angles, and long transportation may remove all traces of the original outline. As long transportation also sorts out impurities, as described in a previous section, it follows that the purer sands are likely also to be the more completely rounded.

It may happen that rounded quartz grains may be enlarged by the deposition of new silica. When this occurs, the added material usually restores the lost crystal form to the grains, making the sand again angular. This process is known as quartz enlargement. It can often be detected under the microscope by a thin film of ferruginous or other stain within the new crystal boundary, which marks the outline of the old rounded grain.

As a rule, sharp sand has been considered more desirable than round for structural purposes, because it would hold better to the cement or lime. The belief is growing, however, that sharpness of grain is not so important, and according to the Bureau of Standards, round sand is as good as sharp sand.

Smoothness or roughness of grain is quite as important as sharpness or roundness. A grain whose surface is rough and pitted will allow lime or cement to cling to it much better than will a thoroughly polished grain. As rounding and polishing are apt to go together, it may perhaps be the smoothness of rounded grains rather than their lack of angularity that is objectionable.

If rounded grains are disadvantageous, other properties of the sand may readily counterbalance this disadvantage. The surface of the sand grains should also be clean and free from any film of impurities that might weaken the hold of the lime or cement.

It is to be noted that a sand with angular grains has a higher percentage of voids than one with the same sized round grains. The lower percentage of voids of round grains may in part compensate for the smaller degree of sharpness. Unfortunately, there is no unit or quantitative standard of angularity; the value of a statement that a certain sand is round or sharp depends, therefore, on the experience and judgment of the man making the statement.

SOUNDNESS OF GRAIN — Even more essential than the form of grain is the soundness of grain. Each individual grain should be at least as resistant both to tensile and crushing strength as is the cement used to bind the aggregate together.

SPECIFIC GRAVITY—The specific gravity of a sand is dependent on the specific gravity of the constituent minerals. By far the most abundant mineral of an average sand is quartz, the specific gravity of which varies from 2.653 to 2.660. The presence of minerals of greater or less specific gravity somewhat modifies this figure. Flint, or chert, which is a common variety of quartz in many sands, has a specific gravity of 2.60 to 2.64 and its presence in quantity tends to lower slightly the specific gravity. Decayed grains of chert in sands being often porous, the specific gravity of some chert sands runs particularly low, as a result of air included in the minute pores of the rotted chert. Sands containing lignite also run low, as lignite has a gravity of only 1.15 to 1.3. The specific gravity of the feldspars varies between 2.5 and 2.9, while orthoclase, the most abundant variety, has a specific gravity of 2.57. Highly feldspathic sands will, therefore, often run lower than quartz sands, though they may sometimes run higher when the more basic members of the plagioclase feldspar series are present.

Kaolinite, the chief constituent of clay, has a gravity varying between 2.60 and 2.63; consequently, very argillaceous sands run slightly lower than pure quartz sands. Hematite (sp. gr. 4.9 to 5.3) and limonite (sp. gr. 3.6 to 4.0) occur usually only as a thin film or coating on the grains, but their presence in considerable quantities may appreciably increase the specific gravity of the sand. As a rule, however, the percentage is low, being less than 1 per cent in the most ferruginous sand examined from the glass sand formations. Theoretically one per cent of hematite would increase the specific gravity of a pure quartz sand about 0.015, raising it from 2.66 to 2.675.

Magnetite (sp. gr. 5.168 to 6.180) occurs abundantly in the so-called magnetite sands in which the specific gravity invariably runs rather high. Calcite has a specific gravity of 2.714, only slightly above quartz, and when present as a cement, is usually not in sufficient quantity to modify the specific gravity appreciably. Beach sands, however, with abundant shell fragments, made up of calcite, run higher than pure quartz sands. Among the so-called ferro-magnesian minerals, are several with specific gravities ranging around 3.10 to 4.30, and when present in quantity these raise the specific gravity of sand.

Determination of Specific Gravity

A method for determining the specific gravity of sands is as follows: A sample is thoroughly dried and weighed. Into a graduated tube was poured a measured volume of water. Into this water was

poured the sample of sand. The mixture was then thoroughly shaken in the tube to be sure that all the voids were filled with water, and that no air adhered to the individual grains. The total volume of the mixture, less the original volume of water, represents the actual volume (exclusive of voids) of the sand added to the mixture. The weight in grams divided by this volume (in cubic centimeters) gives the specific gravity of the sand. The solution is expressed by the formula:

$$\text{Spr. gr.} = \frac{W}{Vt. - Vw.}$$ in which

W = the weight of the dry sand expressed in grams,
Vw = the volume of the water in the tube expressed in cubic centimeters, and
Vt = the total volume of the sand and water in the tube expressed in cubic centimeters, whence
Vt. — Vw. = actual volume of sand, exclusive of voids.

Another method is by use of a le Chatalier bottle graduated to tenths of a cubic centimeter. The weight of the bottle and the weight of water it contains when full are usually furnished by the maker, but may be determined by the operator. For particular work all weights are taken at a known temperature, and temperature connections applied, but for work on sands, this is not necessary. After the weight of the bottle, empty and full of water, has been determined, a known weight of sand is placed in the bottle and the bottle filled with water, care being used to eliminate all bubbles. The whole is then weighed. The specific gravity is determined by the following formula:

$$\frac{Ws}{(Ws + Wb) - Wt}$$ Sp. Gr., in which

Ws = the weight of the sand (in grams).
Wb = the weight of the bottle filled with water only (in grams), and
Wt = the total weight of the bottle with sand and water (in grams), whence
Ws + Wb = the total weight of the substance involved and
(Ws + Wb) — Wt = the weight of the water displaced; and hence its volume.

Specific gravity is a property little considered in the practical use of sands. It may be said, however, that any considerable variation from 2.65 in the specific gravity of a sand points to impurities or to porosity of the individual grains, and gives some hint as to the chemical properties.

(To be continued)

Standard Sizing of Sand and Gravel

Indiana Sand and Gravel Producers' Association Takes Initial Step —The First Mineral Aggregate Association to Act

AFTER MANY YEARS' DISCUSSION by both users and producers of sand and gravel it seems that it has remained for the Indiana Sand and Gravel Producers' Association to take the first step to establish a standardization of sizes and nomenclature. After a number of district meetings of producers throughout the state the executive committee of the association has adopted a tentative standard, which has been submitted to the chief engineer of the Indiana State Highway Commission.

E. Guy Sutton, secretary of the Indiana Association reports:

"In talking with Mr. Bishop (the engineer of the Highway Commission) on the subject, he stated that the tendency was toward using a coarse aggregate for road construction and it might be found advisable to add a 3-in. size to the list given below.

"You will appreciate the fact that the question is not merely of local importance, since all the states in the Mississippi Valley are covered by the Committee of State Highway Engineers appointed to investigate the subject. However, A. T. Agg, Chairman of the Committee, has proimsed to let the National Association make its recommendations before final decision is reached. It may be, therefore, that the present agitation of the matter may result in bringing about a standardization of sizing which will be of great benefit to the industry."

"It is not expected that all plants are equipped to produce each size, but that such sizes as are produced shall be designated by numbers given.

"It is further recommended that sand and gravel specially proportioned for concrete purposes, commonly called Concrete Mix, shall be designated in the form of a fraction in which the numerator represents the size of the gravel as indicated by the foregoing numbers, and the denominator the percentage of the gravel in the mixture. Example: 5-65 would mean Concrete Mix ranging in size from 1-in. down to fine sand and containing 65 per cent of gravel above ¼-in."

Below are the recommended standard sizes and nomenclature of the Indiana Association:

Standard Sizing and Notation for Sand and Gravel

Numbers	Limits of Size
SAND	
0	1/10-in. down
1	⅛-in. down
2	¼-in. down
GRAVEL	
3	½-in. to ¼-in.
3-A	½-in. to ⅛-in.
4	¾-in. to ¼-in.
4-A	¾-in. to ⅛-in.
5	1-in. to ¼-in.
5-A	1-in. to ⅛-in.
6	1½-in. to ¼-in.
6-A	1½-in. to ⅛-in.
7	2-in. to ¼-in.
7-A	2-in. to ⅛-in.
8	2½-in. to ¼-in.
8-A	2½-in. to ⅛-in.

"The sizes specified refer to the finished product and not to the screen perforations. It is assumed that the designated sizes of both sand and gravel are reasonably well graded between the maximum and minimum limits."

Protest Against Preferential Use of Open Top Cars

THE CHICAGO ASSOCIATION OF SAND AND GRAVEL PRODUCERS has adopted the following resolution, and action by the Illinois State Association is now pending. Copies of the resolution were sent to the Director of Car Service, United States Railroad Administration, Washington, D. C., and to all the regional directors in the territory under discussion.

WHEREAS recent action of the Car Service Section of the United States Railroad Administration clearly indicates undue preference is being given movement of open-top cars for coal loading; and

WHEREAS sand and gravel are basic commodities, the produtcion and preparation of which to meet specifications of engineers and architects require heavy plant investment and large labor costs; and

WHEREAS any undue restrictions against free movement of cars for handling these materials would not only cause producers to assume heavy losses through curtailment of production, but would seriously interfere with road building programs and all other forms of public and private construction work and would incidentally throw thousands of men out of employment; Therefore,

BE IT RESOLVED by members of the Chicago Sand and Gravel Producers Association, who are engaged in the production and marketing of sand and gravel in Illinois:

1. That open-top or gondola cars must be distributed equally in respect of all commodities requiring that class of equipment and that such cars should not be termed coal cars.

2. That any undue preferential movement of open-top cars for coal loading is an unjust discrimination against sand and gravel.

3. That each member of this Association endeavor at all times to impress upon transportation officials the important position held by sand and gravel as basic building materials, with view to having them so recognized and to the end that all discriminations as to car supply, movement and other forms of service required of common carriers may be removed.

IT IS FURTHER RESOLVED that copies of this resolution be sent to Director of Car Service Section, United States Railroad Administration; to each Regional Director and to Superintendent of Transportation of each railroad serving members of this Association.

Relative Weights of Crushed Stone and Gravel

"ONE OF THE HARDEST THINGS that we have to contend with in certain territories where crushed stone is sold is to get the trade to figure any different weight than 3,000 lbs. for gravel and 2,500 lbs. for stone," writes W. G. Van Etten of H. D. Conkey & Co., Mendota, Ill.

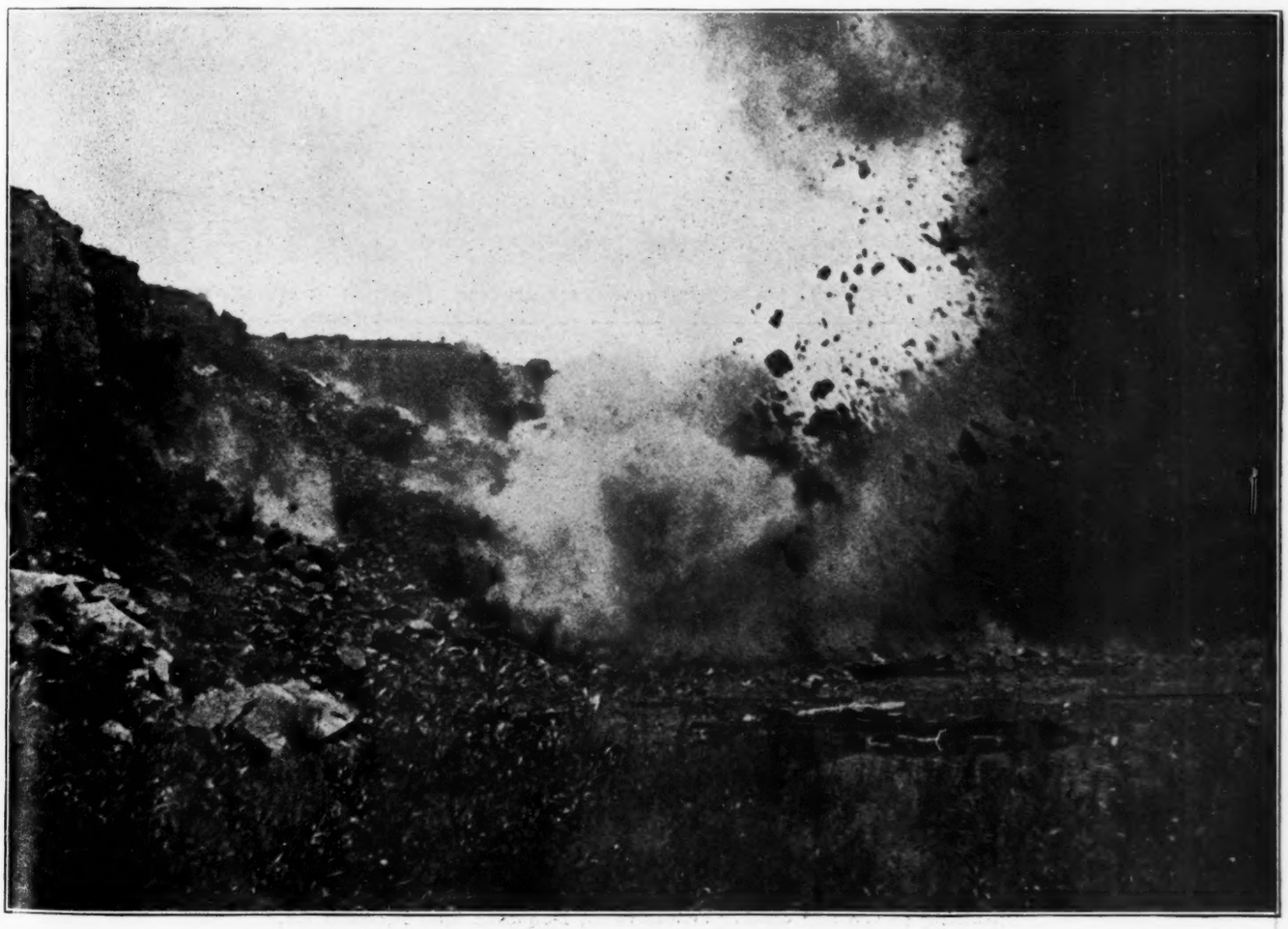
"Probably the fault of this lies with the gravel producer, as too often he has been content to use this method of figuring and has made no effort to change it—in fact, we do not believe that all producers of gravel actually know what their material weighs.

"With the above in mind we have prepared a table (one of which is shown herewith) giving the weights of material at three of our pits. This table shows that our washed gravel does not weigh much more per yard than a good quality of limestone, and when the fact is taken into consideration that because the voidage in limestone is greater than that in gravel, more sand is required, one can readily see that the old basis of figuring 3,000 lbs. of gravel and 2,500 lbs. of stone is manifestly unfair to the gravel producer.

"We believe that this is something every producer of sand and gravel should look into and should advise his trade of the weights of the various sizes that he produces."

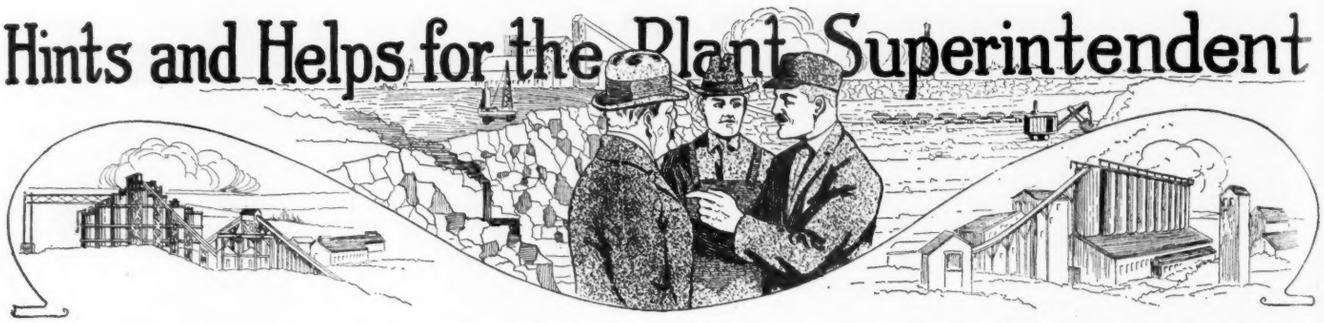
New Kind of "Trap Shooting"

THROUGH the courtesy of Harold P. Brown, moving picture photographer for the International Film Service, Chicago office, we show below a *real* picture of the big blast at Dresser Jct., Wis., described in ROCK PRODUCTS, August 16, pp. 28-31. Mr. Brown's camera was smashed by falling rocks and he narrowly escaped serious injury. Nevertheless he kept going for 10 seconds and his "movies" of the blast are now being shown in motion picture theaters throughout the country.



Trap rock chunks weighing from one to two or three tons on the wing

Hints and Helps for the Plant Superintendent



Scalping Screen Arrangements

PRACTICE IN THE USE of scalping screens shows a great variety of arrangements. Many plant operators apparently are not convinced of the need of scalping screens at all.

Probably the choice of using a scalping screen depends upon many factors and can not be decided off-hand on general principles. However, some operators do make it a general principle not to elevate the same material twice.

The accompanying illustrations show how two operators put this principle into effect. The upper view shows the arrangement provided at one of the plants of the Janesville Sand & Gravel Co., Janesville, Wis., which has the reputation of being very efficiently operated.

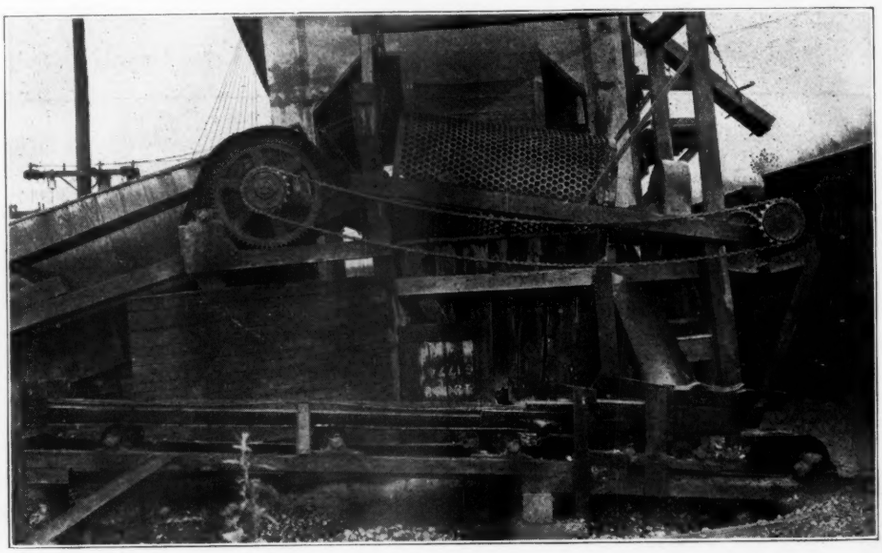
The material comes from the pit by a series of belt conveyors. A crusher is placed at the pit end of the last flight of conveyors. The coarse gravel is separated out by a grizzly and goes through the crusher. The fines of course bypass the crusher.

Instead of carrying the material from the crusher house to the top of the screening plant as is the usual practice, it goes to the foot of the screening plant and through a short cylindrical scalping screen, driven by a chain from the belt conveyor.

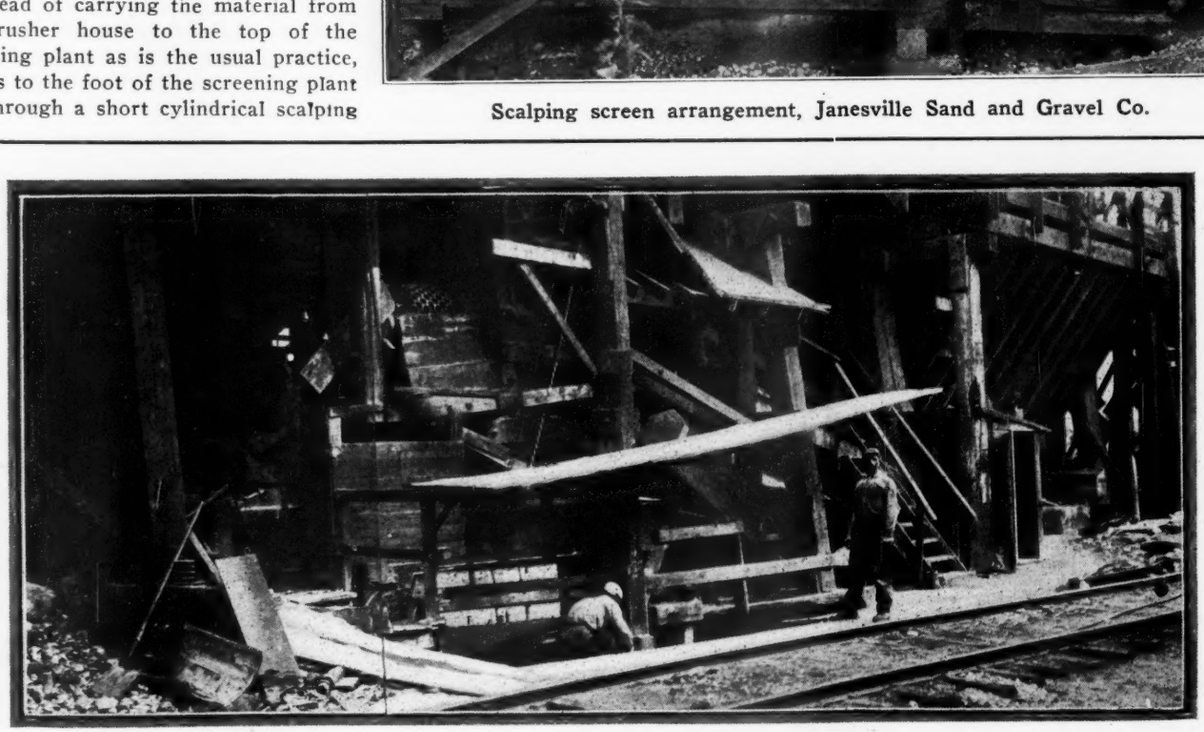
What passes the scalping screen goes to a hopper and by a bucket elevator to the top of the plant. The rejections are chuted to a conveyor belt parallel to the incoming belt and are returned to the crusher.

A little different arrangement to serve the same purpose is shown in the lower cut of the crushing plant of the Duquesne Slag Products Co., Pittsburgh, Penn. The raw material here is brought to the plant in standard-gauge railway hopper-bottom cars.

These are dumped into a V-bottom hopper which feeds a short belt leading to the scalping screen. The material



Scalping screen arrangement, Janesville Sand and Gravel Co.



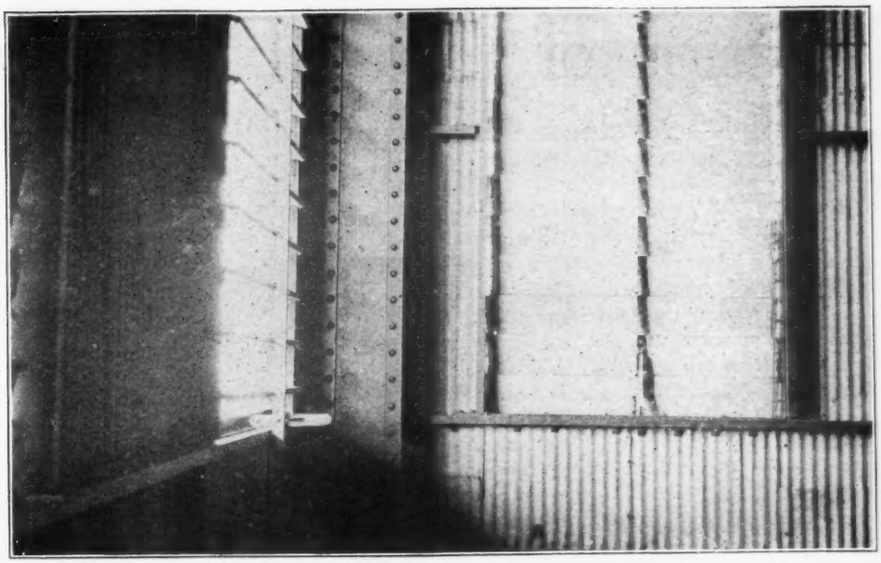
Scalping screen and crusher arrangement, Duquesne Slag Products Co.

passing this screen goes to a hopper below and then to a belt conveyor which feeds a bucket elevator to the top of the plant. The screen rejections fall into a small jaw crusher at the end of the screen.

Crushing Plant Windows

THE ACCOMPANYING ILLUSTRATION on the right shows a recent solution of the light and ventilation problem in a big crushing plant. This plant is entirely of steel except the window louvers shown. These are wooden slats operated by a lever at the window seat.

This is the way in which all the windows in the new crushing plant of Laurin and Leitch, near Montreal, Que., are covered. This plant was designed by the J. C. Buckbee Engineering Co., Chicago. A complete description of this plant will appear in the next issue.



Window louvers at plant near Montreal

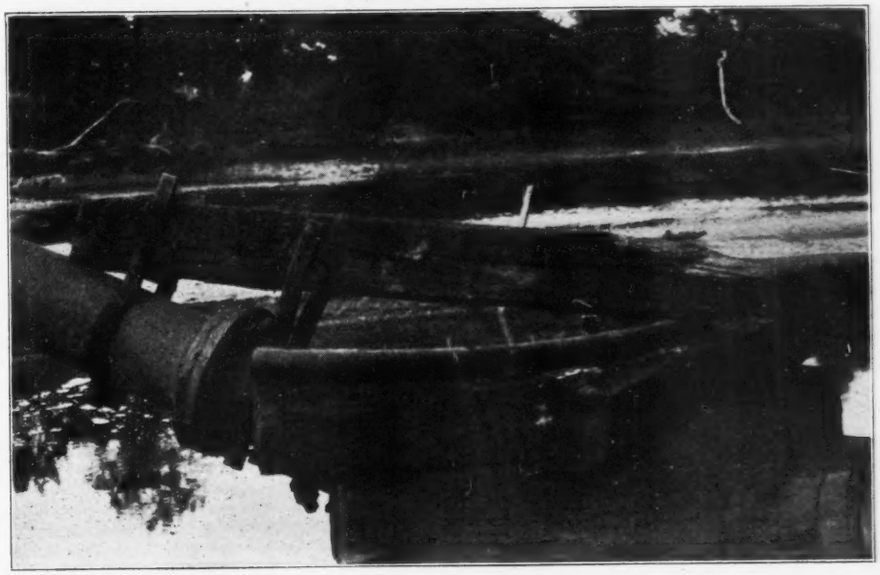
Saving Hose on Suction Dredge

THE TEN AND TWELVE-INCH suction hose used on Mid-West sand and gravel dredges is now an expensive commodity and its preservation is a saving in operating expense worth looking into.

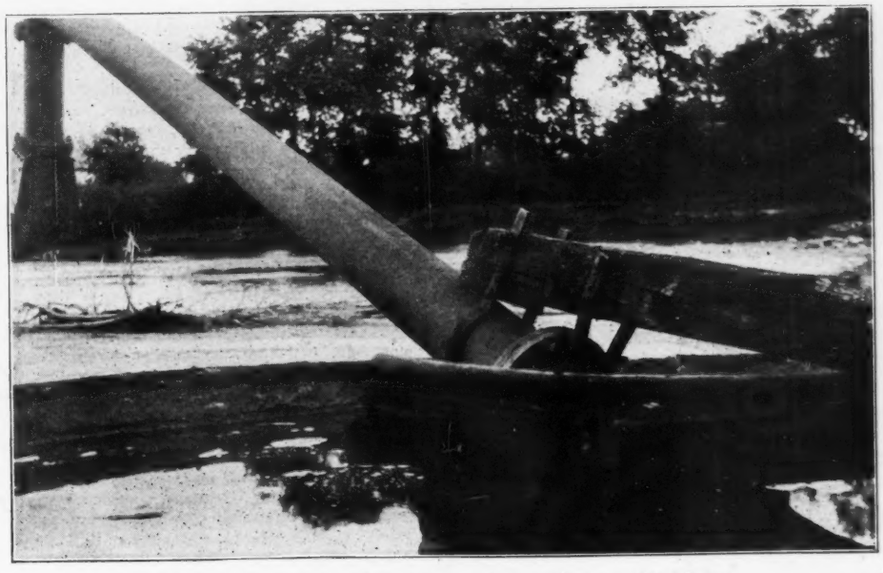
The accompanying illustration shows a simple device used by R. Snoddy, manager of the Coon River Sand Co., Des Moines, Ia. On the suction intake end of his dredge is a crib of timbers surrounding the intake pipe, as shown in the views. On top of these timbers is an arc of steel pipe about 2-in. in diameter and 6 or 8 ft. long.

To the pipe intake beyond its connection with the flexible hose coupling is fastened a 10x10-in. square timber by means of two iron straps. The other end of the timber is free to move about the arc of 2-in. pipe as a fulcrum.

It will be seen at a glance that the 10x10-in. timber carries the weight of the intake pipe and provides a universal joint at its connection to the dredge, which prevents load and wear on the hose coupling. This simple device lengthens the life of the hose many times over the usual connection where the hose takes all the wear and strain.



Timber connection for taking load off hose coupling



Coon River Sand Co. scheme for saving suction hose

Question Box

GOT a problem you want help on? Send it in. We will agree to find some operating man who can answer it.

Design of Large Rock-Crushing Plants

Part I—Development of Crushing-Plant Design—Main Breakers—Secondary Crushers

By Brownell McGrew

THE HISTORY of the development of the large crushing plant of the present day has been one of enterprise and rapid achievement. The economic causes underlying this development are too well known to require more than the briefest mention here. Each and every one of them hinges upon one or both of the following two factors: an increasing market for stone, and a decreasing and high-priced labor market.

From the little plant of two decades since—with its one small crusher, elevator, and screen—to the great and complex layout of machinery that constitutes the modern large capacity plant is a long step. Many mistakes have been made during the course of this development; many are still being made. But the tendency to discard old rule-of-thumb methods in favor of more efficient design is becoming more and more manifest.

Choice of Equipment

A wide diversity of opinion is held among engineers and stone men as to choice of the different types of crushing-plant machinery; and with this, a rather remarkable tendency on the part of many to adhere to a certain type, under all conditions—giving scant heed to the merits of other machines which are, in many cases, far superior for the class of service desired. This practice has often resulted, not only in unsatisfactory performance, but in total failure of the machine; generally causing the engineer to switch his loyalty rather violently to another type—with the foregone conclusion that, sooner or later, he will repent his mistake.

So also with the general plant layout. Often the engineer or operator selects a certain design because it has given good service elsewhere, without regard to the class of product desired in his particular case.

The writer believes that an intelligent study of the conditions to be met, the advantages and limitations of the various types of machinery, and the problem of arranging the machinery to give the required output, will tend to eliminate many of these mistakes. Efficient design is a necessary forerunner of efficient operation; and the engineer who keeps in view only the elements of capacity and first cost is apt to come to grief.

The following factors are chief among those to be considered in selecting crushing machinery, and in the plant design:

1. Product desired.
2. Character of stone to be crushed.
3. Capacity desired.
4. General layout of the quarry, and ground contour at the proposed plant site.
5. Whether or not the plant is intended for permanent service.

In addition to the above, problems peculiar to each particular quarry will present themselves for solution. All these should receive careful consideration by the designer.

With the above factors known, the first logical step of plant design is to consider the performance characteristics of the various types and classes of machinery.

The Author

MR. McGREW was born at Thornton, Ill., in 1890, at the time his father was superintendent of the Brownell Improvement Co. plant, so that he was literally born in the crushed-stone industry. Subsequently the father became general superintendent of the three plants of the Chicago Gravel Co., and it was with this company in 1906 that Brownell McGrew got his first experience in the mineral aggregate industry. Since then he has been employed by the Casparis Stone Co., the Allis-Chalmers Manufacturing Co. and the Bethlehem Steel Co. on both construction and operation of crushing plants.

Mr. McGrew has held the positions of plant and quarry foreman, assistant superintendent, erecting engineer, superintendent of construction and master mechanic with quarry and crushing companies. He has done considerable "trouble shooting," redesigning and reconstruction work on old plants to increase capacity and efficiency, in both crushing and fine grinding plants.

In 1911 Mr. McGrew installed the machinery in the Fairmount, Ill., plant of the Casparis Stone Co. and during 1913 and 1914 erected three other plants for this company, including the one at Kenneth, Ind., which has an 84x66-in. jaw crusher.

In 1917 he erected the plant of the Knoxville Power Co. at Alcoa, Tenn., and later in the same year and in 1918 he had charge of erection of two plants for the Bethlehem Steel Co. (Bethlehem Mines Corporation) including the one at Bethlehem, Penn. He has just completed remodeling the plant of the L. & M. Stone Co. at Prospect, N. Y., which is his present address.

Main Breakers

In selecting a main breaker we have to consider: the capacity wanted, the character of the stone to be crushed, and, to a certain extent, the product desired. In referring to main breakers in this article, the writer wishes to make it clear that he has in mind only the large sizes of initial, or primary crushing machines used in connection with plants of medium and large capacity. The universal familiarity with the design of these different types of machines makes it unnecessary to go into a detailed description of them. We will confine our consideration of them to a study of their performance. Large breakers are built in three general types: gyratory, jaw and roll.

The Gyratory Crusher

The gyratory is undoubtedly the best known, and most widely used of the three types. Over 7300 of these machines have been built by only one of the leading manufacturers of crushing machinery. Their reliability, wide range of adaptability, and moderate power and upkeep cost, have given them a pre-eminent position in the rock and ore-breaking field. "When in doubt, put in a gyratory" has come to be a maxim among stone men; and long years of service stand behind their faith.

The gyratory crusher will give satisfactory results on very hard grades of stone; and the largest sizes have rated capacities of as high as 2500 tons per hour. The annular discharge opening prevents the passage of large slabs, and gives a uniformly graded cubical product. This feature makes the crusher especially effective in the reduction of thinly stratified rock where the tendency to slab in the crusher is bad; an ad-

vantage that it holds, in common with the slugger rolls, over the jaw crusher. Stratified stone, or stone which contains distinct lines of cleavage, can in most cases be blasted out in such sizes that the big gyratory crushers will receive the majority of the run-of-quarry without secondary shooting.

The gyratory lends itself readily to the installation of two feed tracks, a feature that is very desirable when the stone is to be drawn up an incline to the machine.

Another feature that recommends this type of breaker is its accessibility for repairs and renewals, and the fact that its parts can be handled by a crawl with but one plane of travel—whereas both roll and jaw types require a traveling bridge crane for the proper handling of their parts.

The Jaw Crusher

The jaw crusher is a type that is rapidly coming into favor as a main breaker. The first type of crusher to come into general use in the small sizes, it was the last of the three types to be developed as a breaker of mammoth proportions.

Its unobstructed rectangular receiving opening and rugged construction make it an ideal machine for reducing large blocky stone of the hardest character. While its capacity is somewhat less than that of either of the other two types, of like receiving opening, there are certain conditions where its employment will effect a considerable saving in quarrying cost, and will result in a very efficient and economical plant.

In many of the large deposits of limestone and bastard trap rock there is no stratification or distinct lines of cleavage. Stone of this character will invariably shoot out in big blocks, especially when the well-hole method of drilling is used. For conditions of this kind, in plants of from 3000 to 5000 tons capacity per ten-hour day, the big jaw operating in conjunction with a secondary crusher undoubtedly leads the field. Its superiority over the other types is particularly manifest where the stone is extremely hard and abrasive.

The designer should bear in mind, however, that the big jaw crusher is essentially and purely a *main breaker*—developed to cut down the cost of quarrying and crushing stone, by handling the largest sizes of quarry stone that can be economically loaded by the modern steam shovel. This crusher should not be expected to reduce the bulk of its product to commercial sizes, nor indeed, to sizes that the final re-crushers and screening machinery will be able to handle. The closing up of the discharge opening in an effort to attain this result greatly reduces the output, and tends to overload the machine—producing excessive stresses in the parts thereof.

The writer has in mind an installation where this fact was ignored, with the result that the machine was a conspicuous failure; the repairs and replacements running into thousands of dollars during the first season the machine was operated.

An excellent rule to follow is: Do not let the ratio of the receiving opening to the discharge opening exceed six to one on hard rock, and eight to one on the softer grades. The operator who exceeds ten to one on any kind of rock is courting trouble.

For commercial crushing the best practice is to install a secondary breaker below the initial machine, and to pass the product of the latter directly into the second crusher. The big jaw may then be set to a safe opening. This method is very essential to the success of the installation when the rock is extremely hard; and in any event will amply repay the investment in the secondary machine by redoubled capacity. An 84x66-in. jaw crusher operating in conjunction with a No. 12 gyratory makes a well balanced initial breaking plant, that can be relied upon for an output of from 300 to 500 tons per hour, according to the character of the stone and the size of product which the second machine is set to turn out.

Roll Crushers

The principal advantages of the single and double "slugger" roll crushers are large capacity, small amounts of fines produced, absence of large slabs in the product, and the fact that bridging or choking is reduced to a minimum by the action of the slugger knobs. The second characteristic recommends them especially for service in limestone flux plants, where fines are objectionable, and in many cases have to be wasted. There are also many ballast plants throughout the country at points where there is little or no sale for the fines produced. In either case the roll crusher will effect a substantial saving by cutting down the amount of this grade.

The double-roll crushers, with their radial slugging action and high peripheral speed, reduce massive blocks of stone with a speed unequalled by any other type of crusher. It is this very feature, however, that sometimes militates against their use in plants of moderate capacity. The 6 by 7-ft. rolls will crush for short periods at the rate of from 3000 to 4000 tons per hour. When the rest of the plant is designed to handle from 500 to 1000 tons during the same period, it can readily be seen that it will be greatly overloaded at intervals, unless some device for distributing the feed is installed.

This is sometimes done by passing the stone directly into other machines for further reduction; a hopper between the machines taking care of the discrepancy in capacity. Another method is to use the skip system of elevation; loading from an ample hopper beneath the rolls, and elevating into the screens or secondary crushers, with another hopper to take care of the skip discharge. Whether or not the expense of either of these installations is justifiable will depend upon conditions peculiar to each individual plant.

Neither the double nor the single roll crushers are as economical as the two "pressure" types on hard or highly abrasive stone; and the writer believes that their use should be avoided on stone of this character.

The single roll crusher is a very efficient machine for crushing the softer grades of stratified limestone for either flux or cement-making purposes. The 36x60-in. size has a capacity of from 300 to 500 tons per hour, depending upon the thickness and hardness of the material. The 60x84-in. machine will, of course, handle thicker blocks of stone; and its capacity is correspondingly greater than that of the smaller size. The single roll is also satisfactory for crushing limestone for ballast or commercial purposes. It should be remembered, however, that they cannot be expected to economically crush hard, blocky stone, nor stone of a highly abrasive character. In their field they have no equal—but discretion must be used in delineating the limits of that field.

A distinctive feature of both classes of rolls is their ability to "eat" stone, so full of dirt or clay that it would choke a gyratory or jaw crusher. As the writer has always strongly advocated sending clean stone to the plant he is not sure that he is consistent in urging this as an advantage. Nevertheless, there are those who will find it so.

Secondary Crushers

By secondary crusher is meant a machine installed between the initial breaker and the separating and distributing units—and not the final rejections crushers; although there are many plants where one set of units serves the double purpose. For purposes of plant analysis the secondary crushers may be considered as integral with the main breaker, as their sole purpose is to help the latter take care of the ratio of reduction between the run-of-quarry and the desired output.

In general, the performance characteristics inherent in the larger crushers may serve as a guide in the selection of a secondary machine. More will be said in regard to this class of crusher in connection with plant design.

(Subsequent articles will discuss other features of plant design.—Editor)

Decisions on Quarry Operations

Liability of Employers in Blasting Accidents

THE OBLIGATION OF AN EMPLOYER to provide reasonably safe places for his employes to work does not obligate him to keep the places where the employes work in a safe condition at every moment of the work so far as its safety depends upon the due performance of that work by them and their fellow servants.

Falla v. Pine Mt. Granite Co., —— Ga. ——, 97 Southeastern 114, p. 115.

Hazardous Business—Care Required—Safe Tools

A quarry operator is engaged in hazardous business, and it is his duty to exercise care commensurate to the danger to be reasonably anticipated and to furnish such tools as will, so far as is reasonably practical, protect his employes from danger.

De Nardo v. Stephens-Jackson Co., —— Pa. ——, 104 Atlantic 584, p. 585.

Dangers from Blasting—Duty to Warn

The dangers from blasting in quarry operations is one frequently recurring and its occurrence can be foreseen by the person charged with the duty of watching it, and if the danger is not foreseen and proper warning given the quarry becomes an unsafe place for the workmen; but it may be made reasonably safe if proper warning is given. It clearly follows that on the person whose duty it was to take care that the place should be kept safe was cast the duty of giving timely warning and it is a part of the operator's duty to his employes that proper care should be exercised in giving warning of an expected blast.

United Verde Copper Co. v. Kuchn, 253 Federal 425, p. 427.
Belleville Stone Co. v. Mooney, 60 N. J. Law 328, 38 Atl. 835.
Hjelm v. Western Granite Contracting Co., 94 Minn., 169, 102 Northwestern 384.
Jacobson v. Hobart Iron Co., 103 Minn. 319, 114 Northwestern 951.

Firing Blasts—Warning—Failure to Heed

In the operation of a quarry it was the custom of the operator to fire blasts about 10 minutes after the end of the work for the day, a warning being given by blowing a whistle five times when it was expected that employes within the danger zone would seek shelter. The failure of an employe to obey the whistle while a careless and perhaps negligent omission of duty was not such serious and wilful conduct as would amount to a defense under the Connecticut Workmen's Compensation Act, and especially where the employe stopped at a commissary maintained by the employer within the danger zone and kept open at quitting time and where the employer in fact invited the employes to stop on their way home.

Merlino v. Connecticut Quarries Co., —— Conn. ——, 104 Atlantic 396, p. 397.

Blasting—Irreparable Injury—Injunction

Where the facts averred show that irreparable injury is being sustained by blasting operations and the continuous throwing of rock and other debris on the complainant's land and that such trespass is a continuous one for which the law furnishes no adequate relief, an injunction will be made perpetual.

Woodstock Operating Corp. v. Quinn, —— Ala. ——, 79 Southern 253, p. 254.

Blasting—Injury to Land—Disputed Title—Injunction

In an action to enjoin quarry operations on the ground of the continuous throwing of rock and other debris on the complainant's land, injunction can not be granted if the title to the land in question is in dispute and where the complainant has not taken steps to establish his title.

Woodstock Operating Corp. v. Quinn, —— Ala. ——, 79 Southern 253, p. 254.

Foreman's Direction to Continue Work—Promise to Repair

A boy 16 years old was engaged to drive cars loaded with rock from the quarry to the crusher. At a certain point at the top of the grade he unhooked the singletree from the car, turned the horse to the side and permitted the car to run by gravity to its destination. The hook that held the singletree had become mashed, bent and battered and made it difficult to remove the singletree while the car was in motion. Prior to his injury the boy had called the foreman's attention to the condition of the hook and the foreman had directed him to go ahead and use it for a day or two and they would have a new one made. The boy believed he could rely on these statements and was legally justified in doing so, and did not assume the risk occasioned by the defective condition of the hook and by reason of which he was subsequently injured by the car running upon him while he was attempting to remove the singletree from the defective hook.

Gingerly v. Phelps Stone & Supply Co., —— Mo. App. ——, 206 Southwestern 400, p. 401.

Use of Iron Tamping Bar

A quarry operator knowingly permitted the tamping of explosives to be done with iron bars and failed to supply any wooden rods or other implements for that purpose. Under such circumstances the quarry operator was liable for injuries caused by an explosion while the hole man was using a tamping bar in filling a drilled hole with explosives, where the evidence was sufficient to justify the inference that the explosion was caused by the use of the iron tamping bar.

De Nardo v. Stephens-Jackson Co., —— Pa. ——, 104 Atlantic 584, p.

Assumption of Risk—Safe Place

An employe in a quarry assumes the ordinary risks of his employment and is bound to exercise skill and diligence to protect himself.

Falla v. Pine Mt. Granite Co., —— Ga. ——, 97 Southeastern 114, p. 115.

Risks Not Assumed by Employes

An illiterate foreign laborer who had never been employed in any other mine or quarry than that of the particular operator and who had no knowledge of blasting except as done by the quarry operator and who had never been warned of the danger of tamping explosives with an iron bar and who might assume that the employer had taken proper precautions for his safety, can not as a matter of law be charged with the assumption of the risk of danger from the use of an iron tamping bar.

De Nardo v. Stephens-Jackson Co., —— Pa. ——, 104 Atlantic 584, p. 585.

Fellow Servants—Who Are

Where two or more employes are engaged in the same service in quarry operations and are engaged in labor for the furtherance of the general purpose of the business in which they contract to service an are subject to the general control and direction of a single employer, they are fellow servants, though they may be employed in different departments or duties and so far removed from each other as that one can in no degree control or influence the conduct of the other.

Falla v. Pine Mt. Granite Co., —— Ga. ——, 97 Southeastern 114.

Fellow Servants—Stone Cutter and Engineer

A person employed by a stone company in the cutting or breaking of stone is a fellow servant with the engineer and

fireman of a locomotive operated by the same company in connection with the stone industry and with the employes engaged in making blasts in the quarry of stone. The quarry operator is not liable for injuries occasioned to one servant by the negligence of a fellow servant.

Falla v. Pine Mt. Granite Co., —— Ga. ——, 97 Southeastern 114.

Negligence—Proof of Injury—Physical Facts

The duty of a boy 16 years old was to drive a horse hauling cars of stone out of a quarry. When the car reached the top of the grade it was his duty to detach the horse and the car would then run by gravity to its destination. While attempting to detach the car from the horse by leaning over with his head and shoulders in front of a moving car, the work was unnecessarily prolonged by reason of the defective, bent and battered condition of the hook that held the singletree and that by reason of such delay the car rushed forward, striking him on the side of the face and inflicting the injuries complained of. The fact that the plaintiff testified that the car struck him on the right side of his face is immaterial, though an impossible physical fact under the circumstances of the case, but it could not defeat the action where the evidence showed that the lower jaw bone was broken, many of his teeth knocked out, his face cut and bruised and he sustained a severe shock and injury to his head, and especially where the complaint did not state that the car in fact struck him on the right side of the face, though he so testified.

Gingerly v. Phelps Stone & Supply Co., —— Mo. App. ——, 206 Southwestern 400, p. 401.

Quarrying and Crushing Oil Shale

Difficulties Met With in Handling a Dusty, Gummy Material Calls for Quarry and Rock-Crushing Experience

THE QUARRYING, CRUSHING and refining of western oil shale deposits continues to develop and certainly in the not far future will be an important rock-products industry. A writer in a western oil paper describes some of the special features of shale quarrying and crushing as follows:

The method of quarrying depends on whether or not oil only is to be obtained. If the by-products are sought the shales should be graded or sorted. One company has a quarry plan and the levels or benches stripped show four grades of shale in a seventy-five foot bed in a cut of 175 ft. These sorted shales go into four different chutes at upper tram terminal and are dumped beneath to a loading platform at lower terminal, where they are slid into four separate bins for shipment, or may be shot on to a crusher beneath the terminal as desired.

Skill must be acquired in the blasting and the grading, and it is just as necessary in the crushing. One company will crush to quarter-inch and another to forty-mesh for their retorts. A crusher must be selected according to the grade of shale mined.

There is so much oil and gas in the best shale that not only does the oil and gas sometimes explode from friction, but the crusher becomes red hot as well, and then the shale gums up. If heated shale is run from a crusher to a screen, it also gums up the screen, preventing the crushed shale from going through.

The crushing in itself is as much of a problem as the location of the quarry, the quarrying or the sorting will be. Ball crushers are out of the question, as shales should be crushed dry and balls or pebbles would gum. Gyratory, jaw or Marathon may be adaptable to some shales, but probably a ring-roll pulverizer will be the best try in the first place.

Jaw crushers will probably be as useless as the ball or pebble by reason of the heating and gumming. Average shale crushed to half an inch are the requirements of most mills, but the milling of shales must be done finer to obtain best results in distillation.

At the top of a tram shales should be broken to fist or tea-cup size first for a crusher. With a ring-roll pulverizer it is as difficult as the crushing of carnotite ores. A mill man is dusted as if he were in a flour mill with the gray dust that is the grit of the shale. The only difference is that of color. In carnotite crushing he resembles a canary bird and shifts worked are short owing to the dust flying to eyes and lungs. In shales it is the same fierce proposition.

But if shales were crushed wet they would gum worse. One company has a successful crusher attachment by which the crusher is kept cool and the material blown through the pulverizer-screen. This mill has crushed to the extent of eleven tons an hour and to 200 mesh, which is beyond the average shale company requirement.

Native Talc and Soapstone Superior

Producers Must Overcome Prejudice in Favor of Imported

THE MARKET FOR DOMESTIC TALC and soapstone continues uncertain, according to R. B. Ladoo, United States Bureau of Mines. Users of high-grade talc, who have been dependent largely upon domestic talc during the war, are hesitating to place contracts for this year owing to the uncertainty over import conditions. Normally, the largest sources of high-grade talc for toilet purposes are Italy and France, but during the war imports declined and the deficit was made up by domestic production. A large amount of this high-grade talc comes from California. The Madoc district in Ontario produces an excellent talc, used largely in the paper industry, and much of this material is imported into the United States. The total imports of talc during April, 1919, were 531 tons of powdered talc, all from Canada, valued at $9,318, or about $17.50 per ton.

Before the war, talc suitable for cutting into cubes and blanks for the manufacture of "lava" gas tips and electrical insulation came mainly from British India through England, Sweden, Spain and France. Several deposits of this grade of material exist in this country and have been worked successfully. During the war imports of cutting grade talc were greatly reduced, but domestic producers were able to supply the needs satisfactorily. Manufacturers prefer foreign talc, chiefly because it is cheaper and because some of it has a lighter color after burning. However, domestic talc is far superior to some foreign talcs in compactness and in lack of cleavage, and the darker color may be considerably lightened by treatment after burning.

The future of the domestic talc industry thus seems to rest upon the following factors: (1) The overcoming of prejudice in favor of foreign talc. (2) The improvement of methods of mining, grading, grinding, sizing, and purification so as to produce a better product at a lower cost. (3) The extension of the uses and therefore the market for talc. Domestic producers are aware of their problems, but they should unite to obtain more efficient and concerted action toward their solution.

Domestic talc, ground, is now quoted at $16 to $60 per ton, and imported talc at $55 to $60 per ton.

The Use of Lime in the Glass Industry

Raw Limestone Coming to Be Preferred to Calcined Limestone—Purity of Stone a Prime Requisite

By F. Gelstharp
Chief Chemist, Pittsburgh Plate Glass Co., Pittsburgh, Pa.

LIME IS ONE OF THE CHIEF constituents of all the common kinds of glass that are manufactured in large quantity, such as window, plate, bottle, pressed and blown ware glass, in which it may be present in from 8 to 13 per cent of the weight of the glass. There are some other fluxes which could be used instead of lime, but they are all too costly and many of them are not satisfactory. Lime is found to be eminently suitable, not only on account of its fluxing property but due to the fact that it imparts the properties of toughness, and resistance of the glass to atmospheric corrosion, and it can be so readily obtained in comparative purity in the form of limestone.

The manufacturers of bottles and pressed and blown ware have always preferred to use calcined limestone (burnt lime) and some even prefer hydrated lime. The general impression of such users is that the burnt or hydrated lime gives them better melting conditions and a glass of better color than can be made by use of limestone. In recent years some of these manufacturers have been induced to try limestone and have been quite successful in producing a glass at least equal to that formerly produced from burnt lime.

The manufacturers of window and plate glass have always used limestone and prefer it to any other form of lime as their product is entirely satisfactory; whereas, in their experiments on the trial of ground burnt lime or hydrated lime, trouble was experienced unless special care was exercised in the mixing with the other materials and frequently testing the strength of the lime.

Why Limestone is Preferred

Naturally limestone is a more desirable material to use as it can be shipped and stored much more easily than burnt or hydrated lime, it can be obtained at a very much lower price and its composition does not change on standing, as in the case of burnt lime.

High Calcium Stone Preferred

Much has been written on the question of whether a high or low content of magnesia should be sought. A high magnesia limestone (that is higher than 1.5%) is not desirable in the manufacture of plate glass, although it can be used even with very much higher amounts than 1.5% if the rock is uniform in composition by making certain changes in the glass mix to adjust the viscosity of the molten glass. Variation in the magnesia content affects the melting condition and the uniformity of the glass.

Experiments show that magnesia compared to lime in chemical equivalents produces a glass which is not so fluid under equal conditions; but when compared pound for pound there is little difference noticed in the fusibility.

THIS ARTICLE is written especially for Rock Products by the foremost glass chemist in America. It will be followed by a similar article on silica rock and sand for glass making.

It may be interesting to producers of magnesium limestone that it has been found that magnesia tends to prevent devitrification or crystallization in glass, and lowers the coefficient of expansion.

Limestone should be prepared by grinding to pass a 10 or 12-mesh screen and it has been found good practice to have not more than 10 per cent remain on a 16-mesh screen, as this gives a degree of fineness that mixes well with the other batch materials and gives a quick melt.

The following gives a comparative analysis of limestone from different localities which are found satisfactory for the several kinds of glass manufactured:

	1	2	3	4
Silica and Clay	1.00	0.23	0.60	0.50
Ferric Oxide	0.13	0.10	0.05	0.14
Alumina	0.05	.....	0.08	0.04
Calcium Carbonate	97.81	98.12	98.56	89.07
Magnesium Carbonate	1.01	1.55	0.71	10.25
	5	6	7	8
Silica and Clay	0.84	0.44	0.94	0.08
Ferric Oxide	0.06	0.26	0.10	0.02
Alumina	.....	.....	.....	0.12
Calcium Carbonate	98.60	98.50	98.05	99.25
Magnesium Carbonate	0.50	0.80	0.91	0.53

Limestone containing more impurities than the poorest of the foregoing could not be considered good for any glass except for the commoner dark green or amber bottles. No. 8 is of exceptional purity and can be used in the manufacture of the highest grade of colorless glass.

Comparison of Different Stones

The eight examples have different characteristics. No. 1 is dark blue-gray and has a comparatively tough nature, hard to crush and not at all crystallin. No. 2 is white, very soft and easily crushed to powder retaining its crystallin structure which will pass through a 100-mesh screen. No. 3 is a dense dark gray stone varying in shade and occasionally containing bonds of clear calcite crystals. No. 4 is a dense white rock-like marble in appearance, being shaded with dark bands and calcite crystals. No. 5 and No. 6 are dense grayish-white stones of uniform texture with occasional shell fossils. No. 7 is medium soft white rock composed entirely of minute fossilized shells. No. 8 is a fine soft white stone and when ground fine is as white as chalk.

Dark gray or blue-gray colored stones contain carbon, in fact most all stones contain some organic matter.

Since the appearance of good limestone varies so much, it is not possible to properly judge the quality of a limestone by its appearance; a chemical analysis must be obtained.

Purity Essential

The purity of limestone for the better kinds of glass manufacture is of prime importance; even where a very pure stone is not demanded, at least it must be regular and uniform in composition. Careful selection of the rock at the quarry should be made, otherwise foreign material is introduced, which gives the glass maker endless trouble and loss till he is able to determine which of the several batch materials is responsible. It is so often found that bad limestone is responsible that all glass makers suspect the limestone first.

Some limestones contain 2 to 3 per cent of silica or quartz. This need not be objectionable if it does not vary but slightly.

Alumina in the form of calcareous shale will not give trouble if present only in small amount. If, however, the alumina is present in the form of ganister which is a hard insoluble refractory silicate of magnesium, lime and aluminum, or as clay, such limestone is not suitable for glass manufacture, as it will give endless trouble by producing striae and stones in the glass.

Iron may be present as ferrous carbonate ($FeCO_3$), iron pyrites (FeS_2) or weathered pyrites (Fe_2O_3). The main trouble caused by this impurity is the green color it imparts to glass, so that the limit for iron expressed as Fe_2O_3

must be fixed by the quality or kind of glass to be made.

For plate glass Fe_2O_3 should not exceed 0.15% and this is the extreme limit. Less than 0.10% Fe_2O_3 is most desired.

For special glasses even 0.05% must be considered high.

Phosphorous and sulphur are never present in limestone in sufficient amount to cause trouble.

Special Uses for Dolomite

I have not mentioned the use of rich dolomitic limestone in which the magnesia content is sometimes as high as 40 per cent. Such stone will make excellent glass in properly proportioned glass batches, and it is commonly used in the calcined form, but mostly where the glass melting is done in tank furnaces in which case variations in ratio of magnesia to lime (which is most likely to occur with this material) can be more easily tolerated than where melting is done in pots; particularly in the case of manufacturing plate glass.

The opinion has often been expressed that limestones of different characteristic appearance affect the quality of the glass produced. This is not so as it has been proved that the physical differences have entirely departed when the lime in the process of melting combines with the sand and soda to form glass. The chemical composition alone is what affects the quality of the glass and as regards the case of melting, this entirely depends on how fine the limestone is ground provided good mixing with the other materials has been obtained.

The following would represent the limits of impurities in a fairly good limestone for use in the manufacture of ordinary kinds of glass.

Clay and Silica	Fe_2O_3	Al_2O_3
1.5%	0.15%	0.10%

Effect of Lime on Potatoes

THE PREVAILING OPINION is that lime is not good for land devoted to raising potato crops. However, Prof. Wm. Frear of the Pennsylvania State Agricultural Experiment Station apparently has a different opinion which is of great interest to lime and limestone producers.

Prof. Frear is quoted by the Philadelphia "Press" as having told the farmers of Pennsylvania in a recent address that:

"In a journey through Long Island collecting soil samples for lime requirement analysis, the writer found that the potato growers of the eastern section were bitterly opposed to liming, though their soils were very acid. The same was found to be the position of farmers in New Jersey. The attitude was based on positive experience that sweetening the soil greatly increased potato scab. Long Island farmers have had the same experience with Canada wood ashes, also a soil sweetener and a potash fertilizer.

"The writer also had called to his attention the fact that in York and Lancaster counties, Pennsylvania, the farmers raise scab-free potatoes on well-limed soils. The same results were accomplished by Mr. Fullerton, superintendent of the Long Island Railroad Experimental Farm, who raised and exhibited at the Mineola and Riverhead, Long Island fairs, scab-free potatoes.

"In view of this contradictory experience, we resolved to take testimony. It was found that the Pennsylvania farmers sterilized their seed potatoes with formaldehyde. The Long Island and New Jersey farmers interviewed did not . It was further found that the prize potatoes at Riverhead, Long Island, fair all showed traces of scab, though insufficient to check healthy development.

"The upshot of the investigation indicated that sour land checks the development of potato scab more than it hinders potato growth, if the land is otherwise well fertilized. But the average potato crops, under such circumstances, are not more than half those of Europe. The tentative conclusion on the check to scab developed in sour land is confirmed by statements of Prof. Coville.

"The result of Mr. Fullerton's, my own and other inquiries was the suggestion that where the soil was undoubtedly infected with scab, this might be controlled and checked by keeping the soil partially sour by plowing under large green manure crops of crimson clover, winter vech, cowpeas, soy beans or the like, for some seasons, and by sterilizing all seed planted until this fungus pest had died out. On the other hand, potato growth might be encouraged meanwhile by partial liming. It was decided that farmers should be advised to lime potato fields to the extent of two-thirds of the lime need found, making certain that all the seed planted is sterilized."

Effect of Lime on Soil Humus

THE THIRTY-SIX-YEAR fertilizer experiment with fertilizers, manure and lime materials at State College, Pa., was visited recently by the director of the Agricultural Bureau of the Lime Association.

"The results on the plots receiving caustic lime and limestone alone have been widely quoted as proving the detrimental effect of caustic lime through its destructive action on humus," writes Prof. E. O. Fippin. "In the first place, the fact has generally been overlooked that caustic lime with manure has given a yield over the entire period equal to the best plots in the series. In the second place, Dr. Frear finds from his more recent examination of the plots that there is no evidence of any destructive action of caustic lime on the humus and he speaks very positively of his conviction that there is no possibility of such destructive action in a purely chemical manner. This is corroborated by Dr. McIntyre, of the Tennessee Station, who has put the matter to the most extreme test by mixing a strong caustic lime solution with humus and noting the result.

"Four outlying experimental fields for the study of fertilizer problems have recently been established under the supervision of J. W. White. These include lime materials and are placed on different types of soil. At Snowshoe, 18 miles from Bellefonte, they include a comparison of hydrated lime with limestone in different equivalent amounts. Lime materials are clearly beneficial in all cases, but no data on the comparison of caustic and carbonate forms have thus far been secured from these fields."

No Chemical Destruction of Humus

"A large part of the opposition to caustic forms of lime as compared to carbonate forms grows out of the old belief that caustic lime has a direct chemical capacity to destroy humus. Every informed man knows the importance of humus in the soil and the difficulty attached to its maintenance. Lime materials of all kinds in the soil do increase the rate of decay and loss of humus through purely biological changes. Within reasonable limits this is desirable and is one of the purposes in applying lime. On the other hand, Dr. McIntyre, of the Tennessee Experiment Station, finds no evidence of any chemical destruction of organic matter.

"Further, caustic lime applied to the soil in reasonable amounts is shown to change in a few days to the carbonate form and any subsequent effect it may have is as carbonate.

Dr. Frear Reverses His Position

"Finally, the earlier and inadequate investigations of Dr. Frear of the Pennsylvania Experiment Station, which are so widely quoted as proving the destructive action of caustic lime on humus and the persistence of the caustic form of lime in the soil have been completely repudiated by him in his more recent publication, Bulletin No. 261 of the State Department of Agriculture at Harrisburg, entitled 'Sour Soils and Liming.' Thus the opponents of caustic lime on these scores do not have a real argument to stand on.

Federal Suits Against Cement Makers

How Eastern Building Interests View the Government's Action—Say It Is Uncalled For and Will Deter Progress

BUILDING INTERESTS of Greater New York were surprised by the announcement that Attorney General Palmer had requested Joseph L. Bodine, United States District Attorney at Trenton, N. J., to institute an action in equity against nineteen of the most important cement producing companies in the East, says the "Record and Guide," the foremost real estate owner's journal of America. The federal complaint as signed by Mr. Palmer alleges that these corporations have entered into a conspiracy that has more than doubled the price of one of the most important of all building commodities to the consumer.

"In announcing the proposed action against the cement manufacturers Attorney General Palmer made the statement that he considered it a most important move on the part of the Government for the proper control and remedy of the existing high cost of living problem.

The 19 Companies

"The nineteen corporations against whom the action is to be brought includes the following: Atlas Portland Cement Co., Allentown Portland Cement Co., Alpha Portland Cement Co., Bath Portland Cement Co., Coplay Cement Manufacturing Co., Dexter Portland Cement Co., Edison Portland Cement Co., Giant Portland Cement Co., Glens Falls Portland Cement Co., Hercules Cement Corporation, Knickerbocker Portland Cement Co., Lawrence Cement Co., Lehigh Portland Cement Co., Nazareth Portland Cement Co., Penn-Allen Cement Co., Pennsylvania Cement Co., Phoenix Portland Cement Co., Security Cement & Lime Co., and the Vulcanite Portland Cement Co.

Will Deter Building

"Since the announcement of the plan outlined by Attorney General Palmer the feeling of the building industry in this territory is that the action is uncalled for and will react more as a deterrent to building progress than it will help the situation. Cement interests feel that under the circumstances as they exist in the industry and in consideration of the recent period of building inactivity that the cement manufacturers should receive the support of the federal authorities rather than censure, and that as a whole the producers should be looked upon with favor for holding prices at the level that was established more than a year ago, while production costs have generally advanced.

"With the claim that the fixing of price levels was at the direct request of the Price Fixing Committee of the War Industries Board at a time of national emergency, the cement interests under indictment feel that they have been unjustly accused of profiteering. As a matter of fact, the price that Portland cement is selling for today at the mills is considerably lower than that figure established in conference with the members of the Price Fixing Committee when practically all private construction had stopped as the result of the feverish war activity and when the entire output of the mills was being taken for direct and indirect Government building operations in this country and abroad. Since that time the cement producers have had to contend with steadily advancing overhead costs; coal is increasing in price, the labor situation is becoming more and more intolerable through actual scarcity and the general apathetic atttiude on the part of the laboring element to give full value for their wage, the difficulty of obtaining cars for transportation of cement that has been responsible for costly delays and other factors of equal importance in figuring the manufacturing overhead.

"On the other hand, with all of the adverse influences the industry has had to contend with, the manufacturers recently voluntarily reduced the price of their product to a figure below that established as eminently fair by the War Industries Board, and they have maintained this new price in spite of all the influences that would ordinarily be responsible for a revision of price schedules.

Ancient History

"According to the statement of the Department of Justice, the defendants in the proposed action were from 1905 to 1911 organized as members of the Licensed Cement Manufacturers, the members of which were licensed by a corporation organized by certain defendants and were required to sell Portland cement at certain scheduled delivered prices, with freight paid, the prices being uniform for all licenses for any given point of delivery. Following a court action during 1912 the licensing system in effect in 1911 was abandoned.

" 'Nevertheless,' the Federal complaint continues, 'the defendants continued to consider it regular for all to make the same prices at any given point of delivery, regardless of difference among them in costs of production and in freight rates from their mills to the point of delivery, and for all to adhere to the prices made by the defendants doing the largest business.'

Must Make Up War Losses

"It must be remembered that although the application and use of Portland cement rapidly grew before the outbreak of the war, that just as soon as hostilities started, and it became apparent that the United States would be drawn into the conflict, building activity of the country dropped steadily to the extremely low ebb of 1918. With the advancing wage scales, increased cost of fuel and a dearth of labor of the type commonly used for cement production, the mills were pushing their production to the limit of their possibilities, and it was only when the Government restricted both the production of cement as well as practically all construction not absolutely essential to the military aims of the country, that the manufacturers slowed down their production. Since the war ended practically all of the mills have resumed their efforts to increase production upon a scale that would decrease the overhead and make further reductions in price possible to the consumer. Although the majority of the mills in the East are now making and storing cement in excess of the present demand, they are unable to increase their output to any material extent because of the difficulties connected with the labor situation and the other adverse factors identified with production."

Competition and Business Methods and Practice

REASONABLE COMPETITION in business life stimulates progress and economy; undue competition results in loss. It is believed that careful study may disclose methods of improving conditions of business without a violation of the laws against combinations.

There is room for education, discussion and voluntary action without crossing the boundaries set by the law and for consideration as to what modifications of existing laws would most improve conditions.—News Letter of National Federation of Construction Industries.

Talc and Soapstone Producers Form Association

Will Work for Tariff Protection of Their Industry—Raymond B. Ladoo Elected Secretary-Treasurer

A MEETING OF TALC AND SOAPSTONE producers was held in New York on August 12, 1919, at which it was voted to form a Talc and Soapstone Producers Association. While the objects of this association have not been definitely voted upon, it is probable that most of the following objects will ultimately be incorporated in the constitution:

"The betterment of processes and methods used in the mining or quarrying and treatment for market of talc and soapstone.

"A mutual exchange of technical, statistical and market information.

"Expansion of markets through educational advertising.

"Stabilization of markets and prices through standardization of grades and tests, and the adoption of efficient cost keeping methods."

One of the principal activities at present will be a consideration of protective tariff measures, but eventually probably most of the work will be along the lines of research and publicity.

The meeting was called by W. C. Boswell, president of the Hartford Talc Co., Baltimore, Md., who was elected chairman of the meeting. The following producers were present: W. C. Boswell, Baltimore, Md.; H. B. Barling, Talc Products Co., 11 Pine St., New York, N. Y.; Dr. S. Westray Battle, Asheville, N. C., president, Biltmore Talc Co.; Thomas P. Dean, Springfield, Mass., manager, Vermont Talc Co.; Michael Doyle, 44 Park Row, New York, president, International Pulp Co.; R. W. Glendinning, Los Angeles, Calif., general manager, Pacific Coast Talc Co.; Raymond Bardeen Ladoo, U. S. Bureau of Mines, Washington, D. C.; John S. Moore, Johnson, Vt., treasurer, American Mineral Co.; R. L. Rutzler, Charlotte, N. C., Oliver Quartz Co.; W. Edward Seybel, 280 Madison Ave., New York, N. Y., Uniform Fibrous Talc Co.: Frederick Green, Easton, Pa., John O. Wagener & Co.; C. J. Zimmermann, New York City, president, St. Lawrence Talc Co., Inc.; T. S. S. Predmore, Kinsey, N. C., general manager, Alba Mineral Co.; Anglo-American Talc Co., 62 Beaver St., New York City; J. T. Smith, Waterbury, Vt., manager, Magnesia Talc Co.

The following officers were elected: President, Freeland Jewett, president of the Eastern Talc Co.; vice-president, W. E. Seybel; secretary-treasurer, R. B. Ladoo (U. S. Bureau of Mines). The following committees were chosen: Tariff Committee, Messrs. Jewett, chairman, M. Doyle, S. W. Battle, W. C. Boswell, and J. T. Smith; Organization Committee, R. B. Ladoo, chairman, Messrs. J. T. Smith, T. P. Dean, J. S. Moore and H. B. Barling.

Objects of a Trade Association

AN EDITORIAL in the last issue of Rock Products on the subject, "Prices and Profits in the Rock Products," is timely and well worthy of reading, and careful thought. I think it is safe to assume that there is no misconception on the part of any business man as to the purpose of the federal government in encouraging the organization of trade associations to meet industrial requirements during the war. The modern trade association is voluntary; its purpose is not to kill nor hinder fair competition; to justify existence there must be an harmonious relation among the members; there must be co-operative efforts to improve conditions, both local and general; to raise the standard of quality and service; to increase production; to improve methods of marketing; and by no means the least important, to reduce cost. An association which functions in this manner need have no fear of investigation.—Ben Stone, in the Illinois Sand & Gravel Producers Association "Weekly Letter."

There was a general discussion of the tariff question. A vote of thanks was extended to the United States Bureau of Mines through Mr. Ladoo.

Japan in Market for Silica

JAPAN WANTS TO IMPORT white silica sand from the Philadelphia district or from nearby New Jersey points for the largest glass factory in that country. The foreign trade bureau of the Philadelphia Chamber of Commerce has been asked by the owners of a large factory in Osaka to be placed in touch with dealers who are able to export the kind of silica which they require.

Belgian Rock Product Producers Organize for Reconstruction

WASHINGTON, D. C.—Co-operative groups of Belgian manufacturers have recently been organized for the purpose of negotiating orders for American products. The purpose of these institutions, according to the Commerce Monthly, the house organ of the National Bank of Commerce in New York, which has compiled a list of the organizations, is to pool their purchases abroad and to distribute imported materials to the particular industries or plants where the need is greatest. They are private organizations, formed with the assistance of the Belgian Ministry of Reconstruction, following the movement among Belgian business interests to minimize government control of industry and trade after the war. The associations plan to work closely with the government, particularly since the government largely dominates the Belgian exchange situation and is in position to allocate among private interests in that country credits for purchase of materials and supplies abroad.

The purchasing bureaus of associations of interest to the rock industry, with whom American manufacturers or exporters desiring to do business in Belgium should communicate, as compiled by the Commerce Monthly, are as follows:

Quarrying—M. Hankar-Urban, representative, 17 Place de l'Industrie, Brussels.

Back marble quarrying—M. Gauthier, secretaire de l'Association des Carrieres de Petit Granit, Soignies.

Portland cement—Societe Cooperative, Groupement des Fabricants Belges de Cement Portland Artificiel, 4 Montagne du Parc, Brussels.

Sand—Groupement des Sablieres, 27 Rue Haveskerke, Forest.

Freight Rates to Far East

WASHINGTON, D. C.—The United States Shipping Board has just announced new freight rates to the Far East on vessels of the Emergency Fleet Corporation.

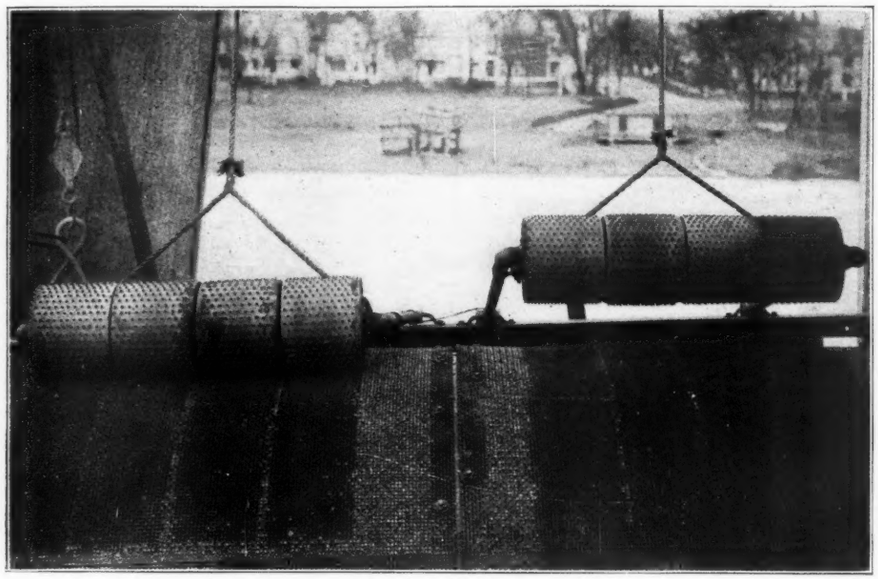
A general cargo rate of $1.12 per hundred pounds, or 62½ cents per cubic foot, ship's option, has been made from North Atlantic ports to Japan, China, French Indo China, Federated Malay States, Dutch East Indies and Philippine Islands.

General cargo rates do not apply to cement to French Indo China, Federated Malay States and Dutch East Indies. A special rate of $1.12 per hundred pounds is fixed for cement in bags, and $1.35 per hundred pounds for cement in barrels, to those destinations.

NEW MACHINERY AND EQUIPMENT

Device for Cleaning Rotary Screens

A SIMPLE DEVICE which is claimed to greatly increase the efficiency of sand and gravel screens is the invention of R. E. Noll, of Marietta, Ohio. The



Noll screen-cleaning device

essentials are clearly illustrated in the accompanying view.

The swinging frame carrying the cleaning rolls is made of wrought-iron pipe sections. It is so arranged as to be readily disengaged when not in use. The toothed rolls are made to fit the screen.

As the screen revolves the rolls revolve with it by the friction of the contact and the gear and pinion effect of the spurs and screen perforation. The several rolls are supplied in place of one long roll because there is a tendency for a loaded screen to sag, which would prevent its contact with the roll throughout its length. The several rolls are loosely mounted on their shaft and so have an angular movement with respect to each other. Thus they maintain contact with the screen even if it does sag.

Second Concrete Ship to Ply Atlantic Waters

THE CONCRETE STEAMSHIP "ATLANTUS," the first of its type to have been delivered from an Atlantic shipyard and the second concrete ship to be operated in Atlantic waters, was turned over by the Shipping Board on August 16 to the Raporel Steamship Line.

New Line of Jaw Crushers

A LINE of jaw crushers built of open-hearth rolled steel plates in place of castings has been placed on the market by the Beaumont Manufacturing Co., Philadelphia, Penn.

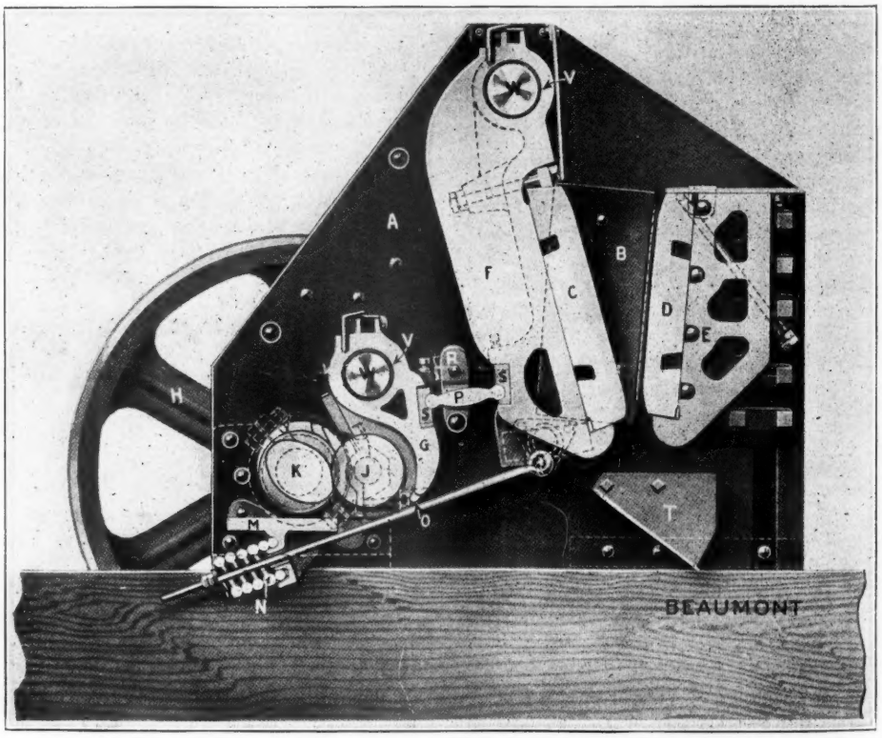
The working details of the new crusher are shown in the accompanying cut. The stationary head (E) is made of cast iron and weighs approximately 1,150 lbs. This casting holds the front crushing plate and is also the spacing block on the front end of the crusher between the sides. It is bolted to the sides by thirteen 1¼-in. bolts. In addition to the bolts there is a tongue accurately placed on each side of the head casting, fitted into a groove in the sides, thus relieving the bolts of all shear.

The check or wearing plates (B) are made of high carbon steel, bolted on the inside of the crusher, one on each side of the opening, and are reversible four times. The swinging jaw (F) is of cast steel and weighs approximately 1,350 lbs. The jaw is suspended from a fulcrum at the top.

The crushing plates have corrugated surfaces, so made that the corrugations on one side fit into the hollows on the other. These plates are made either of charcoal iron or manganese steel.

There are two fly-wheels, one on each side of the machine, which can be belt driven by either.

This crusher is made in five sizes with jaw openings from 9x15 to 24x50-in. and capacities from 12 to 160 tons per hour.



New jaw crusher made by Beaumont Manufacturing Co.

General News From the Rock Products Markets

Universal Portland Cement Co. Changes Publicity Organization

BEGINNING AUGUST 1, the Promotion and Inspection Bureaus of the Universal Portland Cement Co. were combined under the name of "Service Bureau." J. H. Libberton, formerly Engineer, Promotion Bureau and Inspecting Engineer, located in the general offices of the company at Chicago, became Manager of the Service Bureau; G. E. Warren, Assistant Manager; J. W. Lowell, Eastern Manager, Pittsburgh; J. H. Chubb, Northwestern Manager, Minneapolis; and O. L. Moore, Chief Cement Inspector, Chicago.

The two bureaus which were combined formerly had separate and distinct duties, the Promotion Bureau handling special service and furnishing of information to cement users and the Inspection Bureau having charge of the physical testing at the mills. In combining the two bureaus, service rendered to cement users by the department will in no way be changed, either in policy or scope of the work.

Bureau of Standards Busy on Building Materials

WASHINGTON, D. C.—The bureau of standards of the Department of Commerce is now engaged in testing a number of concrete building blocks faced with marble for strength, security of bond and resistance to the action of frost. The results of this work have shown that blocks of this character are suitable for use in construction. They are of considerable importance in that they will permit of the utilization of waste marble, at the same time affording a very attractive facing material.

Extensive tests of coquina shells from Florida to determine their suitability as aggregate in concrete were recently made, and showed that while the resulting concrete was inferior to that made from Potomac River sand, it will be satisfactory for some purposes.

Cement tests during the month of July involved over 227,000 barrels, all of which was shipped for use on various government projects. For failure to meet the requirements of the specifications, 5,000 barrels of cement were rejected during the month.

At the request of the Sand Lime Brick Association, the bureau has recently given some investigation to the theory that the strength of a brick wall or pier depends not only upon the strength of the individual bricks and the mortar, but also upon the adhesion between the mortar and the brick. These investigations have shown that the bond depends largely upon the number, size and shape of the pores upon the surface of the brick. It is possible for the manufacturer of such brick by proper control of his process, in relation to the consistency of the raw mix and of the pressure used in molding, to produce pores of such shape as to increase the adhesion of mortar to the brick to a maximum value.

This Applies to Every Single Producer in the Rock Products Field

REGARDLESS OF VERBAL CAMOUFLAGE, it is clear now that Labor wants not only government ownership of railroads, but is demanding participation in the return on capital. The advocates of the Plumb plan have not said, however, what disposition would be made by the employes of their share of the profits, although that is really the vital feature of the proposition.

In the final analysis, capital in industry represents that part of production which is not immediately consumed, but is held in reserve for improvements and betterments, extensions, renewals and establishment of new enterprises. Therefore, it is very essential that the railroad employes come out in the open and let it be known what use would be made of the division of profits they are proposing be given them.

The so-called Plumb bill is a radical measure, but it is claimed that it has the united support of more than 4,000,000 voters. We know it has been endorsed by the American Federation of Labor and a vigorous publicity campaign is being conducted by its advocates. You may rest assured it has not been drawn in haste.

Knowing these things, it would be most unwise to ignore it. It presents some serious aspects and should be considered by every business man with respect to the effect its adoption would have, first, upon his own interests, and, second, upon the future industrial welfare of the country. There should be no doubt in the Congressional mind as to how this proposition is regarded by Business.—Ben Stone in the Illinois Sand and Gravel Producers' Association Bulletin.

Florida Production of Raw Rock Phosphate

VIRGIL H. LANIER, secretary of the Soft Phosphate Association, Jacksonville, Fla., has some comment to make on the article in ROCK PRODUCTS of August 2 on "Practice in the Preparation of Phosphate Rock." He writes:

"The one correction which I would like to make, or one error to which I would like to call your attention, is the statement that about 10,000 tons annually of soft-phosphate rock are sold.

"The tonnage of the several companies now operating in Florida, the soft-phosphate, reached about 30,000 tons for 1918, and in 1919 will probably reach 40,000, perhaps 50,000 tons.

"About like tonnage of ground pebble was shipped in 1918, making total of around 55,000 to 60,000 tons ground phosphate from Florida alone, 1918. I do not look for any increase in pebble shipments this year, and due to the existing strike, curtailing all pebble, and also to fact that for direct application the soft-phosphate is preferable."

Agricultural Limestone in British Columbia

AN INDUSTRY for the preparation of limestone for agricultural purposes is being established near Vernon, B. C., where there are some excellent limestone deposits. A similar plant is operating near Chilliwack.

The lime and limestone industries now operating in British Columbia include kilns for burning lime for building purposes at Blubber Bay, Texada Island, Esquimalt, Shawinigan and Colwood, Vancouver Island.

A lime quarry is operated at Blubber Bay to supply lime for the Powell River Pulp Company's works. The Whalem Pulp & Paper Co. is quarrying limestone at Laredo Channel for its pulp plant at Swanson Bay.

Ohio Soils Need Ten Tons of Limestone Per Acre

PROF. JOSEPH F. BAKER, department of soils of the Ohio State University, is reported as saying that "whether or not a community is making progress in improving the fertility of its soils can be measured best by the size of its orders for limestone and phosphorus." He further says that "probably three-fourths of the state will require five tons of limestone per acre to make the surface six inches of soil non-acid. Much of the land in Ohio now being farmed will require ten or more tons of limestone per acre before it can be classed as a neutral or non-acid soil."

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Akron, N. Y.	.60	.60	1.00	1.00	1.00	1.00‖
Auburn and Syracuse, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
Buffalo, N. Y.		Railroad ballast, 1.00				
Burlington, Vt.	1.25	1.00@1.10 per ton, all sizes	3.00	1.75@2.00	1.75	
Chaumont, N. Y.		1.75	1.65	1.35	1.25	1.25
Coldwater, N. Y.			Flux, 1.50@2.10			
Grove, Md.	.75	1.85	1.65	1.50	1.25	1.10
North LeRoy, N. Y.	1.00	1.00	.75	1.00	1.00	1.00‖
Walford, Pa.	1.25	1.40	1.50	1.50	1.50	1.50
CENTRAL:						
Alden, Ia.	.40		1.00	1.00	1.00	
Alton, Ill.	1.80		1.40	1.35		
Anna, Ill.		1.00@1.25 for prepared sizes				
Belvidere, Ill.		1.00 for any size produced				
Brillion and Sherwood, Wis.	.90@1.00		1.00	1.00		1.00
Buffalo, Ia.	.70	1.10	1.05	1.00	1.00	
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*		
Dundas, Ont.	.65	1.05	1.05	1.05	.85	.85
Eden and Knowles, Wis.	.80@1.00	.80	1.00	1.00	1.00	1.00
Elmhurst, Ill.	.85	1.00	1.00	.85	.85	.85
Greencastle, Ind.	1.00@1.25	1.10	1.00	.90	.90	.90
Illinois, Southern	1.50	1.25	1.25	1.25	1.10	
Kokomo, Ind.			.90@1.00 all sizes			
Lannon, Wis.			1.00 all sizes			
Lima, Ohio	1.10	1.25	1.10	1.10	1.10	1.10
Mankato, Minn.			(1-in. 1.50)		(2-in. 1.25)	
Mayville, Wis.	.75	.75@ .90	1.00	1.00	1.00	1.00
McCook, Ill.	.90@1.10	1.50	.80@1.00	.70@ .85	.70@ .80	.70@ .80
Montrose, Ia.		1.05@1.10	1.05@1.15	1.00@1.10	1.00	
Ottawa, Ont.	2.50	2.75		2.25	2.00	
River Rouge, Mich.	.80@ .85	1.15	1.15	1.15	1.15	1.15
Sheboygan, Wis.			1.00@1.10 for all sizes			
Stone City, Ia.	.50		(1-in. 1.40)	1.30	1.20	
Toronto, Can.	1.55	1.95	1.95	1.95	1.75	1.75
		These prices include 90c freight				
SOUTHERN:						
Brooksville, Fla.	1.00			2.50		
Cartersville, Ga.		1.60	1.60	1.50	1.50	
Fort Springs, W. Va.	1.00	1.20	1.40	1.60	1.40	
Irvington, Ky.			1.00	1.00	1.00	1.00
Mascot, Tenn.		1.00@1.25				
Memphis Junction, Ky.			Average 1.10			
Winnfield, La.	1.00	1.60	1.60	1.60	1.60	1.75
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
Blue Springs and Wymore, Neb.	.15	1.55	Rip-Rap, 1.30 1.55	1.45@1.50	1.35@1.40	1.30
El Paso, Tex.			1.00 for all sizes			
Kansas City, Mo.	.60	1.40				
New Braunfels, Tex.	.60	1.25@1.50	1.00@1.30	1.00@1.25	.90@1.10	

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Pa.	1.25	1.80	1.70	1.60	1.50	1.25
Branford, Conn.	.80	1.50	1.50	1.20	1.10	
Castro Pt., Richmond, Cal.	.50*		1.50*	1.40*	1.40*	
Duluth, Minn.	.50@.65	1.50	1.35	1.15	1.15	1.00
Farmington, Conn.		1.05	1.05	1.05	.95	
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.40‖
Little Rock, Ark.	1.75	2.50		2.00	1.50	1.35
Millington, N. J.	1.80	1.80	1.80	1.60	1.40	
New Britain, Conn.	.75	1.20	1.15	1.10	1.00	
Oakland, Calif.		1.75*	1.75*	1.75*	1.75*	
Rock Hill, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Winchester, Mass.	.75	.75	1.60	1.45	1.25	1.25‖

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Atlanta, Ga.—Granite	1.60		2.85	2.35	2.35	
Fair Oaks, Calif.—Cr. Bldrs.	.85	1.05	.95	.85	.85	
Hendlers, Pa.—Quartzite	.80	1.00	1.25	1.00	1.00	1.00‖
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	3.50		1.75	1.75		1.00‡
Roseburg, Ore.		1.50	1.25	1.05	1.00	1.00
Smith Siding, Richmond, Va.—Granite	1.25		1.50	1.50	1.50	
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20‖

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, near Rochester, N. Y.—Analysis: $CaCo_3$, 56.77%; $MgCo_3$, 41.74%—80% thru 100 mesh; ppr., 4.50; bulk 3.00

Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); ppr., 4.00; bulk 2.50
Paper bags 4.00

Cobleskill, N. Y.—Ppr., 5.00; bulk 3.00

Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk 3.25

Grove, Md.—90% thru 4 mesh; bulk 3.00

Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(70% thru 100 mesh) in 80 lb. ppr. bags, 4.25; bulk 2.75

Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk 2.25

Lime Kiln, Md.—50% thru 50 mesh; bulk 4.00

Pownal, Vt.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk 2.75

Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk 2.75

West Stockbridge, Mass. — Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk 2.85

CENTRAL:

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh.. 3.00
50% thru 50 mesh 2.00

Anna, Ill.—Ground; bulk 1.25

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, 98.5%; $MgCo_3$, 0.5% 1.75

Belleville, Ont.—50% thru 100 mesh 2.50

Canton, O.—100% thru 10 mesh; 49% thru 100; 59% thru 50 ..... 3.00
80 lb. bags 4.80

Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh 1.00

Columbia, Ill., near East St. Louis —(½" down) ..... 1.25@1.80

Ellettsville, Ind.—Analysis, Carbonate, 98% 2.00

Elmhurst, Ill. — (Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh 1.25

Greencastle, Ind.—(Analysis, $CaCo_3$, 98%) 50% thru 50 mesh 1.75

Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100 ..... 2.75@3.00

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8%.. 2.50

Marblehead, O. — (Analysis: $CaCo_3$, 95.33%) 50% thru 100 mesh ..... 3.00@4.50

McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04% — 100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru 100 ..... .90@1.00

Milltown, Ind.—Analysis, $CaCo_3$, 94%; $MgCo_3$, 3% 1.50

Monon, Ind. 1.25

Montrose, Ia.—(90% thru 100 mesh).. 1.25

Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27% 2.50

Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—70% thru 100 mesh, bulk ..... 2.50@4.00

Rockford, Ill. — Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35% 1.25

(Continued on next page.)

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

St. Paul, Ind.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 12% 1.50

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82% 1.50

Stone City, Ia.—(90% thru 50 mesh) Analysis, $CaCo_3$, 98% ..... .50

Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen) 1.80

Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—
50% thru 50 mesh, bulk 1.50
90% thru 100 mesh 5.00

SOUTHERN:

Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, .04%.
90% thru 100 mesh 2.00
90% thru 4 mesh 1.00

Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh 2.50

Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk 2.00

Irvington, Ky.—(90% thru 50 mesh).. 2.00

Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price 2.00

Ladds, Ga. — Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in 2.50

Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.
(80% thru 100 mesh) 2.50
(All thru 10 mesh) 2.00
Paper bags $1.50 extra per ton; burlap, 2.00 extra per ton.

Maxwell, Va. 2.50

Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 6%—90% thru 4 mesh 2.25

Winnfield, La.—(90% thru 50 mesh).... 3.00

WESTERN:

Fresno, Calif.—(Analysis, $CaCo_3$, 94%; $MgCo_3$, .02%) 50% thru 200 mesh; 90% thru 100; 100% thru 40. Prices for delivery: Sacks, 6.50; bulk Sacks, 10c each. 6.00

Kansas City, Mo., Corrigan Sid'g—
50% thru 50 mesh; bulk 1.35

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:

Berkeley Springs, W. Va. ..... 2.00@2.10
Special hand selected rock 2.50

Cedarville and South Vineland, N. J.—
Glass, damp 2.00
Glass, dry 2.50

Gray Summit, Mo. ..... 2.00@2.50

Guion, Ark—Glass on contracts 1.50

Hancock, Md.—Engine and glass ..... 2.50@3.00

Klondike and Pacific, Mo.:
Contracts 2.00
Car lots 2.50

Mapleton, Pa. 2.50
Glass, damp ..... 2.00@2.25

Massillon, Ohio 3.00

Michigan City, Ind. ..... .30@ .40

Millington, Ill. 1.75

Mineral Ridge, O. 2.75

Montoursville, Pa.—Green, washed ..... 2.00@2.75

Ottawa, Ill. 2.00
Large contracts 1.75

Robinson, Md., washed, screened, not dried 2.00

Sands, Elk Co., Pa.—Selected, green.. 2.50

Thayer, W. Va.—Washed 2.75
Not washed 2.00

FOUNDRY SAND:

Albany, N. Y.—Core 1.50
Molding fine 2.00
Molding coarse 1.80
Brass molding 2.00
Sand blast 3.75

Allentown, Pa.—Core ..... 1.25@1.50

Arenzville, Ill.—Molding fine 1.50

Berkeley Springs, W. Va.—Roofing 2.00

Bowmanstown, Pa.—Core 1.25
Molding fine or coarse 1.50
Roofing pebble 3.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.60	.60	.60	.75	.75	.75
Boston, Mass. (On Docks)	1.25	1.00	1.75	1.70	1.60	1.60
Buffalo, N. Y. (Niagara River)	.80	.80	.75	.75	.75	.75
Farmingdale, N. J.		.43	1.25	1.15	1.05	
Morristown, N. J.	.60	.60	1.20	1.00	1.00	
Philadelphia, Pa.		.95		1.40	1.25	
Pittsburgh, Pa.		.90@1.00	1.10	.90@1.00	.70@ .80	.70@ .80
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
West Peabody, Mass.	.35@ .45	.35@ .45	2.00	1.20	1.20	1.20
CENTRAL:						
Anson, Chippewa Co., Wis.	.50	.50	1.00	.25@1.00	.85	.85
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Chicago		1.25@1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Cincinnati & Miami Grove, O.	.60@ .80	.55@ .75		.55@ .75	.55@ .75	
Columbus, O.	1.00	.65@1.00	.60@1.00	.70@1.00	.70@1.00	.65@1.00
Des Moines, Ia.	50@1.00	.50	1.50	1.50	1.25	1.25
Farlestead, near Flint, Mich.	.55@ .60	.55@ .60		.85@ .90	.75@ .80	.75@ .80
Escanaba, Mich.		.90	1.60	1.20	1.00	.90
Fort Dodge, Ia.	1.10	1.00	1.80	1.80	1.80	1.80
Fort Jefferson and Mechanicsburg, O.	.50@ .60	.50@ .60	.50@ .70	.50@ .70	.50@ .70	.50@ .70
Grand Rapids, Mich.		.65*		1.15*	1.00*	1.00*
Hersey, Mich.	.50	.50			.50@ .75	
Illinois, Northern	.50@ .60	.60@ .70	.75	.60@ .75	.60@ .75	.60@ .70
Indianapolis, Ind.		.60			.75	
Janesville, Wis.	.50	.50	.60	.60	.60	.60
Mason City, Ia.	.60	.50	1.45	1.35	1.30	1.25
Milwaukee, Wis.			1.20 for all sizes			
Moline, Ill.	.60	.60@ .80	1.00@1.20	1.00@1.10	1.00	1.00
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Oxford, Mich.		.55	.90	.90	.80	.80
Rockford, Ill.		.60			.60	
Saginaw, Mich. (Includ'g frt.)	.95	.95	1.60	1.60	1.60	1.45
St. Louis, Mo.	(Mississippi sand, 1.90; Meramec river sand, 1.95)					
St. Louis, Mo., F. O. B. cars	1.35	1.20	1.50	1.30		1.25
Summit Grove, Ind.	.75	.75		.75	.75	
Terre Haute, Ind.	.75	.75	.85	.75	.75	.75
Waupaca, Wis.		.35				.70
Winona, Minn.		.70	1.60	1.10	1.10	1.10
SOUTHERN:						
Knoxville, Tenn.	.85	.85		1.50	1.50	1.10
Lake Weir, Fla.	.50					
Macon, Ga.		.50@ .60				
Memphis, Tenn.	.80	.80			1.00	
New Martinsville, W. Va.	1.30	1.00@1.10		1.20		.70@ .80
Roseland, La., and Condron, Miss.		.40		1.00		
Thomas, La.	.60					1.75
Waco, Texas	.80	.67				1.05
WESTERN:						
Kansas City, Mo.	.60	.60	(Kaw river sand retail 1.50 per cu. yd.)			
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Niles, Calif.		.50@ .75	.50@ .75	.50@ .75	.50@ .75	.50@ .75
Pueblo, Col.	.80*	.60*			1.50*	
Roseburg, Ore.	1.50	1.00	1.25	1.00	1.00	1.00
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
San Francisco, Calif.	1.00@1.25	1.15	1.20	1.20	1.20	1.20
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*		1.25*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Burnside, Conn.	.80*					
Lowell Junction, Mass.	.75*	.65*@.75*	.60*			
Pittsford, N. Y.		.50@ .55			.50@ .60	
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.60	.60	.60	.60	.60	.60
Beloit, Wis.		.60			.60	
Des Moines, Ia.	Washed concrete mix., 25% gravel, .70; 50% gravel, .90					
Escanaba, Mich.	1.00 cu. yd., all sizes					
Grand Rapids, Mich.				.75*		
Grand Rapids, Muskegon, Mich.		.30				.40@ .50
Hersey, Mich.	.50			.50	.50	.50
Illinois, Northern						.50@ .60
Indianapolis, Ind.	Washed concrete, mix, .65					
Janesville, Wis.					.55	
Montezuma, Terre Haute, Ind.					.60	.60
Oxford, Mich.					.85	
Rockford, Ill.	Sand and Gravel mixed, .55@.65					
Saginaw, Mich. (Incldg. frt.)	1.05	1.05	1.20	1.20	1.20	1.20
Summit Grove, Ind.	.50 for all sizes					
Wabash Valley District, Ind.	.60 for all sizes					
Waupaca, Wis.						.40
Winona, Minn.	Pit run gravel under 2-in., .70					
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)		.95		1.00		
Lindsay, Texas	1.25				.50	
Thomas, La.						.65@ .85
Waco, Texas						.67
WESTERN:						
Pueblo, Colo.	.60*	River Run, .60 unscreened				
San Francisco, Calif.	.25 on cars at plant					
Saratoga, Jan Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Emaus, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Buffalo	2.00	.85	.85	.85	.85	.85	.85
E. Canaan, Conn.	4.00	1.00	1.50	1.15	1.00	1.00	1.00
Erie, Pa.	1.75	.85@1.00	1.00@1.50		1.00	1.00	1.00
Emporium, Pa.		1.00	1.00		1.00	1.00	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Hokendaugua and Topton, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Lebanon (Donaghmore), Pa.	2.50	.85	1.50	.85	.85	.85	.85
Philadelphia Dist.	2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh, Pa. (East)	2.05	1.10	1.50	1.10	1.10	1.10	1.10
Pittsburgh, Pa. (West)	2.25	.75	1.50	.85	.85	.85	.85
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
CENTRAL:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ironton and Jackson, O.	2.00	1.25	1.50	1.25	1.25	1.25	1.25
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Dover, Hubbard, Leetonia	2.00	1.10	1.50	1.10	1.10	1.10	1.10

Agricultural Lime and Hydrate Wholesale at Plant per Ton

	— Agricultural Lime— Bulk	Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Berkeley, R. I.		16.00	45	15	
Bellefonte, Pa.	7.25		95.5	.72 to .89	
Bridgeport, Pa.	7.50		55	44	10.25
Cavendish, Vt.		2.50 bbl. in car lots			
Cavetown, Md.	8.50				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	8.00	10.75 grd.	58	38	10.75
Chippewa, Lycoming Co., Pa.	5.00@5.50		78.67	1.33	
Espy, Pa.	4.50		82	1.25	
Farnams, Mass.	5.00	7.50			
Grove City, Pa.	7.00 Imp.	9.00 grd.	75.48	0.80	10.00
Grove, Md.	8.00				10.75
Harrisburg, Pa.			70		12.45
Highgate Springs, Vt.		8.00	85	2	
Hollidaysburg, Pa.	6.50		94.25	.30	
Hyndman, Pa.	5.00	8.50	90.23	2.97	
Lime Bluff, Pa.	5.00@6.25		78.67	1.33	
Lime Ridge, Pa.	5.00@6.25		80.56 to 62.56	3.87 to 1.75	
Mt. Union, Pa.	4.13		96.6		
Munns and Blakeslee, N. Y.	3.00	4.50	53.0		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Ottawa, Ont.	12.00		95	1.5	
Paxtang, Pa.	5.00		60	12	
Rasindale, N. Y.	8.00		96	5	
Steuben, Pa., Dover Plains, N. Y., York, Pa.		8.50@9.50	70		10.75 to 12.00
Union Bridge, Md.	8.50		73	1	10.75
West Rutland, Vt.	5.00	7.50	68	3	10.00
Williamsport, Pa.	5.00@5.50		80 to 90	2 to 3	
Williams Station, Pa.	7.50		60.6	39.1	9.75@10.50
Zylontte Station, Adams, Mass.		8.00			
CENTRAL:					
Alton, Ill.	9.50				
Canton, O.		9.00			9.00
Delaware, O.			50	5 to 12	8.50
Forest, O.	7.50				
Manistique, Mich.		10.00	54 & 95	40 & 1.75	10.00
Marblehead, O.	2.25	3.75			8.75
Mitchell, Ind.	9.00				11.00
Springfield, O.			33.62	17.73	9.00
Woodville, O.					9.75
SOUTHERN:					
Blakely, Ga.	3.00				
Bristol, Tenn.	5.50				
Chippewa, Fla.	5.00		80.0	15.0	
Erin, Tenn.	8.00		99		
Hopkinsville, Ky.	3.00	6.50	98.75		
Hot Springs, N. C.	2.70	4.20			
Knoxville, Tenn.	2.00		57	3	
Lineton, Va.	8.50		97	1.74	
Louis Brook, Va.	8.00	10.25	90	1	
Lushing, Va.	9.00	11.25	60	15	12.75
Maxwell, Va.	4.50		82	1.75	
Mountville, Va.	4.00	5.50	76.6	22.8	
Newala, Ala.	8.50@9.00		99.33		
Ocala, Fla.	4.00	6.00 pulv.	98½ (dry basis)		
Staunton, Va.	6.50	9.00	93	5.5	
WESTERN:					
Bellins, Wash.					12.00
Kirtland, N. M.	10.00				
Knowles, Wis.	8.00	9.50	55	45	9.50
Lime, Ore.	15.00		91.48	0.58	
Oscas Island, Wash.		5.50			16.50
San Francisco, Calif.					15.00
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands per Ton at Plant

(Continued from preceding page)

Cedarville and So. Vineland, N. J.—	
Core, damp	2.00
Core, dry	2.50
Cleveland, O.—Core	1.25@1.50
Molding fine, molding coarse	1.75@2.25
Brass molding	1.25@2.00
Delaware, N. J.—Molding	1.50@2.00
Dundee, Ohio—Molding, steel	1.75
Eau Claire, Wis.—Core	1.75
Roofing sand	3.00
Brass molding and sand blast	2.25
Fleetwood, Pa.—Furnace lining	2.15
Refractory silica	2.15
Franklin, Pa.—Core, traction and brass molding	2.00
Molding, fine	2.00
Molding, coarse	1.50@1.75
Gray Summit, Klondike and Pacific, Mo.—Molding fine	1.50@2.00
Greenville, Ill.—Molding coarse red	1.60
Hancock, Md.—Core and brass mldg.	1.65
Hellam, Pa.—Core	2.00
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.85
Leesburg, Pa.—Core, furnace lining, molding fine and coarse,	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.00@2.50
Molding, fine, dry	3.00
Massillon, O.—Steel molding coarse	2.50
Furnace lining	3.00
Core	2.50
Michigan City, Ind.—Core, bank	.30@ .40
Millington, Ill.—Furnace lining, roofing, stone sawing	1.75
Core	1.50
Mineral Ridge, O.—Core, molding, sand blast, roofing, brass molding, etc., washed, screened (damp)	2.10
Montoursville, Pa.—Core, molding fine, traction, brass molding	1.25@2.00
Ohio—Various points:	
Iron molding, fine	1.50@2.25
Iron molding, coarse	1.75
Brass molding, minimum	2.00
Ottawa, Ill.—Brass molding	2.00
Ottawa, Ill.—Sand blast sand	3.50
Stone sawing	1.75
Core and roofing	1.75
Traction sand	2.00
Furnace lining	1.50
Providence, R. I.—Core	2.00
Molding fine	2.00
Molding coarse	1.80
Brass molding	2.00
Sand blast	3.50@4.00
Sugar Grove, Ohio—Core (dried and screened)	2.00
Traction	2.00
Thayers, Pa.—Core and traction	2.00
Traction	1.75
Roofing, not washed	2.00
Furnace lining	1.25
Warwick, O.—Core	2.25
Furnace lining, green	2.00
Dried and screened	2.25
Molding, fine	2.50
Molding, dried and screened	2.25
Green	1.75@2.00
Wedron, Ill.—Molding	.75@1.00
West Albany, N. Y.—Molding fine	1.75@2.25
Molding coarse	1.25
Brass molding	1.75
Zanesville, O.—Molding fine	1.50
Traction	.75
Molding coarse	1.25
Brass molding	1.75

Ground Gypsum Rock, per Ton, at Plant

Castalia, O.—Raw, to cement mills	3.50
Crushed, not ground	3.00
Land plaster	6.00
Fort Dodge, Ia., bulk	3.50
Garhutt, N. Y.—Land plaster, bags	7.00
Grand Rapids, Mich.—Crushed gypsum	3.00
Ground gypsum rock	7.00
Gypsumville, Man., Can.	3.00
Oakfield, N. Y.	7.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centreville and Gordonsburg, Tenn.—B. P. L., 60% to 70%; ton, 2240 lbs. Ground rock phosphate (90% thru 100 mesh)	6.00@8.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centreville, Tenn.—B. P. L., 60%	7.00
B. P. L., 70%	7.75@8.00
B. P. L., 78%	8.00
Mt. Pleasant, Tenn—(B. P. L., 70%)	
12%	6.00
13%	7.00
14%	8.00
Mt. Pleasant, Tenn.—B. P. L., 60% to 70%	6.00@8.00
Nichols, Fla.—Pebble, B. P. L., 70%	10.00
Wales, Tenn.—B. P. L., 70%	7.50@8.50
Walls, Tenn.—B. P. L., 70.2%—	
To County Agri. Assns.	7.50
To others	7.75

Florida Soft Phosphate

Jacksonville (Fla.) District—Soft phosphate	10.00@12.00
(Add 2.50 for sacks)	
Phoslime, Fla.—Soft	14.00@17.50

General News From the Rock Products Markets

Expansion of Iona Gypsum Co.

THE PLANT of the Iona Gypsum Co. is located two miles from Iona Station in Cape Breton, N. S. This company owns extensive deposits of pure gypsum, located on tide water and in close proximity to the plant. The plant which was completed in July, 1914, is modern and up to date in every respect, and has a capacity of 200 tons per day of finished products. The plant has facilities for producing 100 tons per day of crushed gypsum and other by-products without interfering with the production of finished goods.

The company has facilities for quarrying 500 tons per day which can be increased to any output that conditions warrant. The chief products manufactured are hard-wall plaster, plaster of paris, finishing plaster, stucco, moulding and dental plasters, land plaster and crushed gypsum. These products are known to the trade as "Pillar Brand" and have been used in many of the largest and most modern structures erected in eastern Canada during the past five years.

Through aggressive sales efforts the company has established large and influential connections in Australia, New Zealand, and the United States, where their products found favor in competition with all other gypsum products entering these markets. Besides, of course, the company has established agencies in every town and city in Canada.

During the general depression in the building trades, and the disorganization of transportation systems due to the war. the company's operations were greatly retarded and hampered. But with a bright outlook for the immediate future the company at the present time is making extensive preparations for the coming boom in building. They have already almost completed the building of a two-mile spur of railway from their plant to Iona Station at a cost of $25,000. They have under construction a cooper shop and stave plant to have a capacity of 500 finished barrels per day. This addition to the plant will cost $10,000. Later on it is the intention of the company to spend $25,000 on the erection of large storage bins, and docks with conveyor belt loading equipment to handle export business in crushed gypsum, a large order for which the company is now negotiating.

With these facilities provided, the company will be in excellent position to cater to all demands of the trade. Their favorable location gives them a premier position in meeting the requirements for export business.

The directors of the company are P. D. Park, Halifax; A. A. McIntyre, K. C.; Finley McDonald, K. C.; H. F. Muggah, I. Greenwell, J. B. McCormick, Sydney P. T. Clement, Channel, Nfld.; and N. M. McNeil, Iona. Great credit is due the directors for their untiring efforts on behalf of the company during the past four years, when the abnormally adverse conditions prevailing would have discouraged less patriotic and intrepid men. Their courage and confidence in the face of trying difficulties has, however, saved for the country and the shareholders of the company a vary valuable industry, which is destined in a few years to become one of the most important of its kind in Canada.

The Sydney Investments, Ltd., of Sydney, have been appointed the financial agents of the company.

Memphis Market Activities

MEMPHIS, Tenn.—Building in Memphis continues very active on business structures, warehouses, theatres and downtown places, automobile establishments of various kinds, and a moderate amount of residences, though it is given out that the city is 800 residences behind on building, the last two years' construction work being small.

The Wolf River Sand Co. is active on North Front St., and is operating closely with the building trade.

The Missouri Portland Cement Co. is busy with river sand; they lost a boat several days ago by explosion. Their gravel business is also very good. The cement trade is normal.

Jno. A. Denie and Sons, 82 S. Front St., report stocks of building materials depleted by good demand, cement margins of profit very light, outlook for autumn good.

W. W. Fischer of the Fischer Lime & Cement Co., returned today from Little Rock, Ark., where his firm operates a large plant about like the one here in Memphis. He found building conditions at Little Rock very active.

Carroll County, Tenn., a few days ago voted $85,000 bond issue through its county court for good roads building. The county now has a good many miles of gravel in the leading towns.

Gibson County, Tenn., through its court, in special session on August 18, authorized the issuance of $500,000 of road bonds, the proceeds of which are to be devoted to the construction of permanent highways in Gibson county. W. W. House, chairman of the state highway commission, was present and made an address. The Meridian highway and the Burlington highway both enter Gibson county.

Beet Sugar Production Up Million and Half Tons

LIME PRODUCERS will be interested in the latest crop report on sugar beets, which states: "The condition of the sugar beet crop on August 1, 1919, indicates a production of about 6,960,000 tons. The actual outturn will be above or below that figure, according as conditions from August 1 to harvest are better or worse than average. At the average sugar extraction for the past 10 years (262.5 pounds of sugar per ton of beets) 6,963,000 tons of beets would yield 1,828,000,000 pounds, or 914,000 short tons of sugar. Last year the beet sugar production was 765,063 short tons."

According to a conservative estimate by an expert sugar chemist it requires about 3 tons of lime to 100 tons of beets to make sugar, or the total lime consumption for beet sugar manufacture this year will be around 300,000 tons as compared with 200,000 tons in 1917, and 240,000 tons in 1918.

Practically all beet sugar factories make their own lime, because the carbon dioxide driven off in the burning is an important factor in the sugar-making process. However, they all buy limestone from quarrymen, so that this year's beet sugar crop means the consumption of 600,000 tons of the limestone quarryman's output.

Propose New Cement Plant in New York

INTEREST in the establishment of a big cement plant in Phelps, N. Y., a project which has been under consideration for the last three years but which was sidetracked when the war broke out, is revived by the recent announcement that the principal officers of the Dealers Cement Corporation which was promoting the proposed industry, are interested in another enterprise, the developing of potash beds which were recently discovered on their 22,000-acre tract of coal property in Tioga County, Pennsylvania.

Control of the coal fields prior to the discovery of the potash said to be valued at several million dollars, had been acquired by the Dealers Cement Corporation, of which Walter J. Bennett of Syracuse, N. Y., is president, for the purpose of supplying the proposed cement plant in Phelps with fuel.

What effect the new turn of events will have on the proposed local industry cannot be determined at the present time, but it is predicted by one close to the inside workings of the corporation that it is the forerunner of an era when the Phelps plant will be the largest of its kind in the country, says a local report.

General News From the Rock Products Markets

St. Louis Freight Rate Cases

A NUMBER OF HEARINGS on rate changes, important to shippers of rock, sand, gravel and lime, will be held September 2 before the St. Louis Eastern District Freight Traffic Committee. Docket 539 of the committee is in regard to the rate on lime, common, hydraulic, quick or slaked, minimum car weight 30,000 lbs., from Salem, Ind., to Mosinee, Wis. The present rate is 36½c. per 100 lbs., while the proposed rate will be 22½c. per 100 lbs. The petitioner is the C. I. & L. Ry. Docket 536 concerns rates on crushed stone, carload, from East St. Louis and Columbia, Ill., to stations on the Illinois Terimnal Railroad, viz: Alton, Federal, Wood River, Roxana and Edwardsville, Ill. The present rate is 40c. per 100 lbs. from East St. Louis and 60c. from Columbia. Proposed rate will be 70c and 80c. respectively. Docket 526 concerns rates on cement plaster, wall plaster and stucco from East St. Louis, Illinois, and Upper Mississippi River crossings, to points east of the Indiana-Illinois State Line. The present rates are 83.33 per cent of 6th-class rates and the proposed rate will be the same plus 2c. per 100 lbs. The petitioners are the American Cement Plaster Co. and the Acme Cement Plaster Co. The petition states that it is desired that these rates be published as specific commodity rates, inasmuch as rates on plaster from other points in Central Territory are so published as specific commodity rates.

Docket 494 concerns rates on gravel (novaculite) carload, from Gravel Pit, Ill., to southeastern Missouri points on the St. L. & W. R. R., Missouri Pacific R. R., and St. L. & S. F. R. R. The proposed rates will constitute an average reduction of over 25 per cent. The petitioner is the Mobile & Ohio R. R. Docket 492 concerns rates on sand and gravel, carload, from Bloomfield, Merom, Ind., and Palestine, Ill., to points in Central Freight Association territory. The present rates are those applying on 6th-class commodities. The proposed rates will be combination rates. The petitioner is the Illinois Central R. R. for the Merom Sand & Gravel Co. Their argument for change is that occasional shipments are likely to be offered and as investigation shows that combination rates invariably make less than 6th class rates, the combination should apply. Docket 478 concerns rates on shale, carload, from Staunton, Seeleyville, Prairie, Terre Haute and Macksville, Ind., to Limedale, Ind. The present rate is 5c. per 100 lbs. and the proposed rate is 2½c. per 100 lbs., minimum charge per car $15. The petitioner is the P. C. C. & St. L. R. R. Their argument for change is that the present rate is prohibitive.

Docket 479 concerns rates on sand and gravel, carload, from East St. Louis, Ill., and intermediate points to Calloway and Taylorville, Ill. At the present time there are no through rates from East St. Louis to Calloway and Taylorville and the proposed rate will be 80c. per ton of 2,000 lbs. The Chicago & Alton R. R. is the petitioner and it states that the rate proposed is same as now in effect to Kincaid, Ill., which is 4 miles west of Calloway and 8 miles west of Taylorville, and request that the rate be extended to the two stations named. Docket 480 concerns rates on stone, broken, crushed, ground and rubble, agricultural limestone and rip-rap, carload, from Elsah and Alton, Ill., to Upper Alton, Alton Summit, Wood River, South Wood River, Roxana, East Alton and Gillespie, Ill.

South American Cement Company Increases Stock

THE BOSTON STOCK EXCHANGE has listed the International Portland Cement Corporation: Additional shares to the number of 304,624 of common capital stock, par value $10, making the total number of shares authorized 407,000. Temporary certificates, for the present, will constitute the delivery. These additional shares have been offered to stockholders at $5 a share, and all of said stock has been paid and will be immediately issued. New certificates, representing 102,312 shares of common stock, will be issued, share for share, in exchange for outstanding certificates of deposit of a similar kind and amount.

New certificates for 50,000 shares of preferred stock will be issued, share for share, for outstanding preferred stock. The par of the preferred stock remains unchanged at $50 but the dividend rate has been changed to 6 per cent, and dividends are made noncumulative.

The change in the status of both classes of stock makes it necessary to retire from the list the receipts of the Merchants' National Bank of Boston, which up to today have been a delivery, and accordingly such receipts are sticken from the list.

Chicago Material Men to Be Tried for Conspiracy

THE CHICAGO building tie-up continues in spite of many efforts to end it. A development of interest to rock products producers is the coming trial September 8 of a large number of prominent material men for alleged refusal to sell to contractors who did not take part in the carpenters' lockout.

Other Building Material Producers to Be Sued?

WASHINGTON, D. C.—Further details of the cases recently brought by the Department of Justice against the so-called cement trust have just been made public. These suits may be considered the first of a series which will include all building material interests in which there is evidence of combination, and will form part of the department's share in the campaign against high prices.

Special agents of the department are now engaged in investigating the lumber "trust," and the business of manufacturers of other building materials. Reports of combinations in almost all lines have recently reached Washington, and it is because of the belief that some relief will be forthcoming soon the building operations are retarded in some sections.

Officials of the Government realize that something must be done toward a reduction of prices, if at all possible, if building is to go forward to an extent sufficient to meet the housing requirements of the country.

One phase of the situation that is receiving the attention of the officials is the charge that there are combinations of dealers in building materials, and even builders in different communities, with combinations to fix prices. Associations that exist are considered not a part of this system, but chiefly as organizations for mutual benefits in the matter of credits and progress, so that there is no investigation contemplated of the various trade organizations. There is evidence, however, that there are general price agreements and that these will come under the Sherman law, and district attorneys have been instructed to look into the various cases and begin prosecutions if they are warranted.

Labor Cost of Cement Manufacture Studied

WASHINGTON, D. C.—Information as to the extent to which labor figures in the total cost of production of cement and other commodities, is asked of the Federal Trade Commission, through the President, in a resolution which has just been introduced in Congress by Representative Carss of Minnesota. Mr. Carss, in his resolution, seeks information which will identify or tend to identify the proportion that labor cost forms in the total cost of production of nearly all necessaries of life.

Passed By The Screens

Incorporations

The **Oliver Silica Sand Co.**, Massillon, Ohio, has increased its capital stock from $25,000 to $35,000.

The **American Silica Sand Co.**, of Utica, Ill., has certified to an increase in capital stock from $25,000 to $50,000.

The **United Portland Cement Co.**, Brantford, Ont., has been incorporated with a capital of $200,000 for the manufacture of cement, lime and crushed stone.

The **Brown Feldspar Potash, Limited**, Toronto, Ont., has been incorporated with a capital of $500,000 by K. A. McRae and others to manage feldspar, potash mines and quarries.

The **Premier Sand and Gravel Co.**, Wilmington, Del., has been incorporated for $100,000. The incorporators are T. L. Croteau, C. L. Rimlinger and C. H. Blaske, all of Wilmington.

The **Toronto Cement Products Co., Limited**, Toronto, Ont., have been incorporated with a capital of $20,000 to carry on the business of quarrying and making concrete products.

The **Stringtown Crushed Rock Co.**, McAlester, Okla., has been incorporated with a capital of $50,000. The incorporators are R. L. Hatfield, and H. C. Perry of McAlester and W. F. Wise, of Dallas, Texas.

The **Pilgrim Granite Corp., Boston, Mass.**, has been incorporated with a capital of $50,000. The officers are John J. Barry, president; John A. Rooney, treasurer; Samuel C. Needleman, director.

Hygrade Limestone Co., Gouverneur, N. Y., has been incorporated for $6,000. The charter is for mining, quarrying rock, stone, etc. The incorporators are Fred J. Porter, Frank H. Porter and Ernest D. Porter, Gouverneur, N. Y.

The **Traill Sand and Gravel Co.**, Grand Island, Neb., has been incorporated for $100,000. J. W. Traill, of Omaha, Neb., is president and general manager. The company has acquired a 60-acre tract of land in Grand Island and will erect a plant soon.

The **Lehigh Brick and Rock Products Co.**, Wilmington, Del., has been incorporated for $200,000. The charter permits it to engage in quarrying and dealing in and with fertilizers, etc. S. D. Townsend, C. H. Reed and M. M. Toner, all of Wilmington, are the incorporators.

The **Northwest Lime Co., Ltd.**, 1683 Georgia St. W., Vancouver, B. C., has been incorporated with a capital of $25,000. It has taken over the Northwest Supplies, Ltd., together with their plant and machinery used in connection with lime-burning, as well as existing contracts for the supply of lime, lime rock, etc.

The **Meyers Crushed Stone Co.**, Ashland, Ohio, has been incorporated for $300,000. The incorporators are D. N. Myers and J. W. Meyers, Ashland, Ohio. The company is equipping its vast limestone property in eastern Nebraska, located between Lincoln and Omaha, with modern crushing, screening and loading machinery which will have a capacity of thirty carloads per day.

Quarries

The Utah Lime & Stone Co., Salt Lake City, Utah, has filed a petition with the Salt Lake district freight traffic committee that the rate on limestone, carloads, from Flux, Utah, to Garfield and International, Utah, be reduced to 20c per net ton and to Murray and Midvale, Utah, 40c per net ton in lieu of present rates of 60c per net ton to International and 80c per net ton to Garfield, Murray and Midvale.

The Bruce Mines Trap Rock Co. is the name of what was formerly known as Martin's International Trap Rock Co. The new company has been organized by the bondholders of the old company, which failed. The general offices of the company are in Sault Ste. Marie, Mich. W. S. Edwards is president and general manager. I. Appleton, formerly with the Union Carbide Co. is superintendent of the plant at Bruce Mines, Ont.

The Peru Stone & Cement Co., East Peru, Ia., has changed hands and the plant is being remodeled preparatory for a large increase in business. The president of the new company is C. V. Ray, of the Capital City Sand Co., Des Moines, Ia. The vice-president is J. M. Burrows, of the Des Moines Asphalt Paving Co. J. R. Sterling is secretary and treasurer and in charge of the reconstruction of the plant. The main office of the new company is 308 Fifth St., Des Moines, Ia. The company will produce agricultural limestone as well as commercial crushed stone.

The Arkansas Crushed Stone Co. of Libbie, Ark., with a present capacity of 200 tons of crushed rock per day, is installing new machinery that will increase the capacity to 100 tons per hour, or 1,000 tons a day. The company has 80 acres of blue limestone, which is splendid road material. A complete electric lighting plant is also being installed and will enable the mill to operate a double shift of 10 hours each, making an output of 1,800 to 2,000 tons of crushed rock every 24 hours. The machinery will be completely installed within the next 30 days. The president of the company is Amos Jarman of Helena. R. B. Campbell of Helena is secretary and treasurer and John O. Wilson of Heber Springs is general manager.

Personals

R. S. Weiner has been appointed district manager of the Sullivan Machinery Co., El Paso, Texas, to succeed Don M. Sutor, who has been transferred to the company's St. Louis office as district manager for the territory including Missouri, eastern Texas, Oklahoma, Kansas, western Kentucky and western Tennessee.

Arthur H. Blanchard has been appointed Professor of Highway Engineering at the University of Michigan to occupy the chair recently established by the Board of Regents. He will retain his consulting office at Broadway and 117th Street, New York City, until September 15th, after which he will be located in Ann Arbor, Michigan.

Manufacturers

The Lakewood Engineering Co, Cleveland, O., has hit upon a new advertising stunt. On a recent aeroplane trip from Dayton to Cleveland the aviator dropped 'Lakewood Aerial Bulletins," advertising quarry cars and equipment.

The K-B Pulverizer Co., 92 Lafayette Street, New York City, has inaugurated a new department for the design and equipment of asbestos products plants. They are in a position to submit plans and estimates and supply machinery for the manufacture of all asbestos products.

The Jeffrey Manufacturing Co., Columbus, Ohio, has opened a new branch office in Detroit in the Book Building on Washington Street, between State and Grand Avenues. This office will be in charge of O. B. Westcott, who has had long and successful engineering experience in the sales and engineering-construction department of the company and is well equipped to render valuable assistance to clients in working out the most economical and practical material-handling equipments for their requirements. Mr. Westcott will give personal attention to inquiries for Jeffrey portable loading, elevating, conveying, crushing, pulverizing, screening or tipple machinery, and will welcome the opportunity of serving customers in Detroit and vicinity.

The Marion Steam Shovel Co., Marion, Ohio, has just published an interesting and valuable booklet of 64 pp. on its various types of excavating machinery. The Marion shovel is a well known and popular piece of quarry and gravel plant equipment, but this is only one of the machines made by the Marion company. Some of these other machines that are of equal interest to rock products producers are drag-line excavators, orange-peels, clamshells and cranes, dipper dredges, placer-elevator dredges, hydraulic dredges, etc. The booklet contains descriptions of these different machines with such information in regard to sizes, radius of action, etc., as the rock products producer will want to know. The booklet is abundantly illustrated

The J. D. Fate Co., Plymouth, Ohio, manufacturers of the well known Plymouth gasoline locomotives, is now a part of the Fate-Root-Heath Co., which has been incorporated with a capital of $1,000,000. The new company has taken over the business and properties of both the J. D. Fate Co. and the Root-Heath Co. The plant of the Root-Heath Co. adjoins the Fate plant in Plymouth. It manufactures a line of hardware specialties. The new company owns about twelve acres of land upon which are now located fifteen buildings with approximately a ground floor space of 160,000 feet. The present buildings are of brick and iron construction, and the equipment is modern in every respect. A new foundry building is now under construction in addition to the present foundry which will give a floor area of 300 by 200 ft.; also a new power house and two-story office building. Fully $150,000 will be expended in new construction and equipment, all contracts having been placed, and equipment purchased. J. A. Root is president and H. J. Votaw sales manager.

CLASSIFIED ADVERTISING

Rates for advertising in the Classified Department: 2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Help Wanted

POSITION OPEN

for a first class quarry superintendent. Must be capable of handling quarry and crushing plant. Advise stating age, experience and reference. Good salary for right party. Central New York.

Box 1328 Care of Rock Products

¶ What you don't want someone else wants. And what you need someone else has to sell.

¶ State your needs or what you have to sell—in these columns. They pay!

Plants for Sale

FOR SALE

Crushed stone plant near Wymore and Blue Springs, Neb., on Union Pacific and C., B. & Q. railroads; the quarry farthest west in Nebraska or Kansas; 40 ft. of stone; light stripping; large territory; good prospects; 67 ft. of shale under quarry bed. Ideal location for fancy brick or Portland cement plant. Address

G. H. DAVIS, Blue Springs, Neb.

USED EQUIPMENT

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

STONE CRUSHERS

Need one, large or small? We are headquarters for good "used" machinery of this character. At present our holdings consist of nearly 100 different sizes—Gyratory Crushers from No. 2 to No. 21, Jaw Type from 8x14" to 60x84", also several Symons Disc and Crushing Rolls.

Let us know your requirements and you will hear from us by return mail. Inquiries also solicited for:

Locomotive Cranes, Steam Shovels, Locomotives, Cars, Rails, Hoists, Cableways, Compressors, Etc.

Wm. B. Grimshaw Co., 1048 Drexel Bldg., Phila., Pa.

Dealers in USED but NOT ABUSED Machinery

PRIVATE EQUIPMENT

Bucyrus Shovel, 65 ton, 2½ yd., on railroad trucks.
Bucyrus Shovel, steam traction, ⅜ yd. dipper.
Sturtevant Mill for pulverizing.
Locomotive, standard gauge, 35 ton.
20-ton standard gauge Shay Locomotive.
Duplex Compound Piston Pump, 3,000,000 gals. per day.
Milwaukee D. C. Generator, 8½ K. W., complete.
Tractor, Holt Caterpillar, 75 H. P.
Franklin Compressor, 530 ft., steam.
Drag line, caterpillar, ½ yd. dipper.
1800 ft. track, cars and locomotive, all 36" gauge.
6000 ft. track, cars and locomotives, all 24" gauge.
10 Western Dump Cars, 36" gauge, 4-yd.
10 ton steam roller, 3 wheel.
4 horizontal return tubular boilers, 72"x18', 150 H. P.

D. B. STRALEY, Crown Point, Ind.

FOR SALE

One 18-ton Davenport Saddle Tank Locomotive, 48-in. gauge.

THE CHARLES STONE CO.
Marion, Ill.

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059
Model 75 Marion Shovel, 4-yard dipper, No. 2191

Locomotives

2—American 10 x 16" Locomotives, 36" gauge, with butt joint boilers
4—18-ton 10 x 16" Dinkeys, 36" gauge
2—12-ton 9 x 14" Dinkey, 36" gauge
1—10-ton, 7 x 12" Dinkey, 36" gauge

Cars

20—12-yard Western Air Dump, standard gauge
75— 4-yard Western Steel Beam, 36" gauge
25— 4-yard Oliver and K. & J. Wood Beam, 36" gauge
1—Western narrow gauge hand operated Spreader
26—12-yard Western air-dump standard gauge cars, 19' bed.

Hoisting Engines

1—8½ x 10 DC 2-D Lambert, with boiler
1—7 x 10 DC 2-D Lidgerwood with swinger, no boiler
1—6¼ x 10 DC 2-D Mundy, with attached swinger and boiler

Clam Shell Buckets

2—1-yard Owen
1—1-yard type "E" Blaw
1—¾-yard Owen

Cableway

1—Lidgerwood Cableway, 1164-ft. span, with 9 x 10" DC Reversible Link Motion Cableway Engine, 3-ton capacity

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

H. KLEINHANS COMPANY

Union Arcade **Pittsburgh, Pa.**

The advertiser wants to know that you saw his ad in ROCK PRODUCTS